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FILE

PURSS (G. S.). **Stem rot : a disease of Cowpeas caused by an undescribed species of Phytophthora.**—*Qd agric. J.*, **14**, 3, pp. 125–154, 14 fig., 2 graphs, 1957. [28 refs.]

The *Phytophthora* stem rot of cowpeas causing serious losses in Queensland [cf. **36**, p. 307], first recorded there in 1952 [**33**, p. 136] and probably the same as that described from New South Wales [cf. **36**, p. 455], is shown to be due to a new species, *P. vignae* Purss, which is described in detail. Other fungi isolated from lesions commonly included *Fusarium* spp. and *Macrophomina phaseoli*.

The fungus forms terminal and intercalary chamydospores 12–21 (av. 17) μ diam. Hyphal swellings are usually roughly spherical and intercalary, occasionally terminal. The sporangia, mostly ovoid to ob-pyriform, 24–72 × 15–54 (48 × 27) μ, are either non-papillate or very inconspicuously so. Sexual organs are produced readily in host tissue; antheridia are 12–27 × 9–18 (16 × 15) μ and nearly always amphigynous, oogonia 27–42 × 24–46 (33 × 31) μ, and oospores 24–32 (27) μ on maizemeal agar and 21–30 (25) μ in diseased tissue. The fungus is homothallic. Min. temp. for growth is 10–12° C., opt. 28–30°, and there is no growth at 34·5°.

Excess of water increases disease incidence on lightly infested soil, but is immaterial when soil is heavily contaminated. Seed-borne infection could not be shown, and seed treatment prior to sowing in infested soil was ineffectual. Sowing time is important, infection decreasing with a fall in temperature. In the laboratory infection occurred only at 19–28°.

HUBBELING (N.). **New aspects of breeding for disease resistance in Beans (Phaseolus vulgaris L.).**—*Euphytica*, **6**, 2, pp. 111–141, 8 col. pl., 5 fig., 1957.

From the Institute for Phytopathological Research, Wageningen [cf. **36**, p. 296], methods are described in detail for testing beans for resistance to common bean mosaic and black root caused by the same virus, bean yellow mosaic, stipple streak (tobacco necrosis virus), halo blight (*Pseudomonas* [*medicaginis* f.sp.] *phaseolicola*), rust (*Uromyces phaseoli* var. *typica* [*U. appendiculatus*]), and anthracnose (*Colletotrichum lindemuthianum*). For the last-mentioned disease hard shell beans should be used as the source of resistance to the delta race of the pathogen. A table is given of the reactions of all the local bean varieties to the above pathogens.

SCHMELZER (K.) & POP (I.). **Die Reaktion von Gartenbohnensorten auf die Viren des Tabakmosaiks, des südlichen Bohnenmosaiks und der Tabakmauche.** [The reaction of Garden Bean varieties to tobacco mosaic, bean southern mosaic, and Tobacco 'mauche' viruses.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **11**, 11, pp. 213–217, 3 fig., 1957. [English and Russian summaries.]

At the Biologische Zentralanstalt der Deutschen Akademie der Landwirtschaftswissenschaften, Berlin, 59 *Phaseolus vulgaris* vars. and 3 of *P. coccineus* were examined for their reaction to the viruses mentioned. With tobacco mosaic virus 14 *P. vulgaris* vars. developed blackish local lesions of less than 1 mm. diam. while the remainder developed no symptoms. With bean southern mosaic virus 15 *P. vulgaris* vars. developed necrotic local lesions only, Frühe Breite Wachs also showing systemic necrosis in some cases; in the remainder the infection was systemic, with a more or less distinct green mottling as its only symptom. Bean southern mosaic virus was demonstrable in inoculated leaves of *P. coccineus* but there were no local lesions. With tobacco 'mauche' virus ['tabakmauche', erroneously translated in the past [cf. **35**, p. 128] as tobacco [potato] stem-mottle virus, is a synonym for

'tabak Streifen- und Kräuselkrankheit'; cf. **37**, p. 402] 25 *P. vulgaris* vars. and 2 of *P. coccineus* developed local lesions, the remainder none.

The bush vars. of *P. vulgaris* showed no reaction to tobacco mosaic virus, bean southern mosaic typically caused non-necrotic systemic infection in them, and with the tobacco mauche there was local necrosis. The climbing vars. usually developed local lesions.

Baggett (J. R.) & Frazier (W. A.). **The inheritance of resistance to Bean yellow mosaic virus in Phaseolus vulgaris.**—*Proc. Amer. Soc. hort. Sci.*, **70**, pp. 325–333, 6 fig., 1957.

Further information from Oregon State College, Corvallis, on this subject [**36**, p. 370] suggests that resistance is conditioned by a single gene pair without dominance, with modifying genes which affect symptom severity and the time of symptom appearance.

Swenson (K. G.). **Transmission of Bean yellow mosaic virus by aphids.**—*J. econ. Ent.*, **50**, 6, pp. 727–731, 1957.

Of 17 spp. of aphids tested at Oregon State College, Corvallis, for their capacity to transmit bean yellow mosaic virus, 16 were able to do so, the exception being *Brevicoryne brassicae*; 14 of the vectors are reported here for the 1st time. Of 4 species tested for efficiency of transmission, *Myzus persicae* [cf. **35**, p. 261] was the most successful, followed by *Macrosiphum pisi* [*Acyrthosiphon pisum*; **13**, p. 489], *Anuraphis* [*Sappaphis*] *tulipae*, and *Amphorophora sonchi*, in the order given.

An unexpectedly low rate of transmission was encountered in experiments started late in 1955 with an isolate of the virus obtained from red clover near Geneva, New York, in 1953. No transmission was effected by the last 2,030 aphids tested, although three species (*Aphis gossypii*, *Myzus persicae*, and *Acyrthosiphon pisum*) and different combinations of virus source and indicator plants were used.

Coulombe (L. J.). **Le flétrissement fusarien des Gourganes.** [*Fusarium* wilt of Broad Beans.]—*Rep. Quebec Soc. Prot. Pl.*, **38** (*1956*), pp. 26–33, 5 fig., 1957. [English summary. Received Jan. 1958.]

Wilt of broad beans caused by *Fusarium oxysporum* f. *fabae* [cf. **28**, p. 107] appears to be becoming progressively more prevalent in Quebec. Isolates from affected plants were highly virulent when inoculated in sandy and compost soils.

Zanardi (D.). **Prove di lotta con zineb contro la Peronospora schleideni Ung. della Cipolla (Allium cepa L.).** [Tests on the control of *Peronospora schleideni* Ung. on Onion (*Allium cepa* L.) with zineb.]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 43–50, 4 fig., 1957. [English summary.]

In the province of Pavia, Italy, onions grown for seed have suffered increasingly severe attacks of downy mildew (*Peronospora schleideni*) [*P. destructor*: map 76] in recent years. In field tests 2 plots were sprayed, respectively, with Bordeaux mixture 1%+wetter and 0·3% zineb+wetter 8–10 times between Sept. and July.

By 20 June almost all the unsprayed controls had been killed by the disease. By 10 July the entire plot treated with Bordeaux had been destroyed, though the zineb-treated plants were still in excellent condition. The outbreak was unusually severe.

Vasil'eva (Mme L. N.) & Nelen (E. S.). Преждевременное усыхание листьев Моркови в Приморском крае. [Premature wilting of Carrot leaves in Primorye.]—Вопр. сельск. х-ва Дальн. Востока [*Vopr. sel. kh-va Far East*] 1, pp. 121–126, 1956. [Abs. from *Referat. Zh. Biol.*, *1957*, 23, p. 140, 1957.]

A carrot disease not recorded in other parts of U.S.S.R. and very prevalent in the Primorye region was caused by *Macrosporium carotae* [*Alternaria dauci*]. It is

virulent when the temperature rises. Other diseases of carrots are described with measures for their control.

ZANARDI (D.). **Fusarium, Phytophthora ed Heterodera nella 'moria' del peperone.** [*Fusarium*, *Phytophthora*, and *Heterodera* in wilt of Chilli.]—*Notiz. Malatt. Piante*, 42 (N.S. 21), pp. 16–26, 2 diag., 1957. [English summary.]

In a study during 1955–57 of wilt of chillies (*Capsicum annuum*) in a large commercial plantation in the province of Pavia, Italy, the author isolated from affected material *Fusarium solani* [var.] *martii* [**34**, p. 509; **36**, p. 681] and *Phytophthora capsici* [loc. cit.], often in association with *Heterodera schachtii*. The variations with locality and season of the pathogenic agents associated with the disease account for the different conclusions reached as to its cause and for the frequent failure of soil fungicides to control it.

ELENKOV (E.). Морфологични изменения при вертицилийно болни Пипери. [Morphological changes in sweet Peppers affected by *Verticillium* wilt.]—Бюл. Раст. Защ. (*Bull. Plant Prot., Sofia*), **3** (*1954*), 2, pp. 39–41, 2 fig., 1955. [Received Mar. 1958.]

A disease of sweet peppers [*Capsicum*] in S. Bulgaria, caused dwarfing of the plants and losses up to 90% in 1951. The pathogen, *V.* [*albo-atrum*], proved to be serious only when parasitizing young plants before transplanting. Diseased plants then attain only $\frac{1}{4}$ the height of normal ones, produce little fruit, and often wither in hot weather.

ELENKOV (E.). Върху отношението на сортовете Пипер към вертициаийното увяхване. [On the relation between Sweet Pepper varieties and *Verticillium* wilt.]—Бюл. Раст. Защ. (*Bull. Plant Prot., Sofia*), **6**, 1 (9), pp. 32–37, 1957.

In observations at the Mariza Research Institute, S. Bulgaria, in 1951–56 on the disease of sweet pepper [*Capsicum*] caused by *V. albo-atrum* [see above] 115 varieties were tested by inoculation of the soil in the greenhouse, or by dipping the split roots of plants into a culture suspension. In 1956 studies were also made in the field. The hybrids Mariza 786 and 1005 of California Wonder and Sivria were resistant. Of the varieties of hot pepper, used for the production of paprika, the local Gorolynt is the most resistant. The most susceptible of the sweet peppers are Shiroki (var. *grossum*) and *cerasiforme*.

JOHNSON (K. E. E.), DAVIS (J. F.), & BENNE (E. J.). **Control of magnesium deficiency in Utah 10 B Celery grown on organic soil.**—*Proc. Soil Sci. Soc. Amer.*, **21**, 5, pp. 528–532, 1957.

A tabulated report is presented from the Michigan Agricultural Experiment Station, E. Lansing, of a 2-yr. study of the effects of Mg, K, and Na compounds on Mg deficiency in Utah 10 B celery [cf. **33**, p. 9]. The disorder is characterized by chlorosis of the intervascular tissue, beginning near the tips of the older leaflets and spreading progressively downwards along the margins and inwards between the veins. Necrotic areas develop and subsequently the entire blade dies and withers.

On Houghton muck the deficiency was counteracted by broadcasting and working into the soil 2–4 tons of $MgSO_4.7H_2O$/acre. Equally effective was a foliar spray of 10 lb. of the same compound in 100–150 gal. water, applied at 10-day intervals from a month after transplanting to the end of the growing season.

K fertilizers, used singly or in combination with NaCl, tended to increase the incidence of Mg deficiency. The symptoms described above were reduced to a minimum when the exchangeable Ca/Mg ratio in the soil was less than 3:1 and the Mg saturation of the exchange complex exceeded 22%.

Janežič (F.). **Črna listna pegavost Endivije.** [The black leaf spot disease of Endive.] —37 pp., 7 fig., 1 graph, Kmečka knjiga, Lubliana, 1957. [English summary.]

In Slovenia, Yugoslavia, leaf spot disease on endives attacks leaves of all ages, producing target spot rings with a light grey-brown centre of about 1 mm. diam. The disease appears in June–July and is worst in Aug.–Sept., depending on the wet weather. It also attacks chicory to some extent, producing spots 2 mm. diam. with red-violet margins. The *Alternaria* type spores measure 66–260 × 11·5–24·5μ. The period of incubation on endive under favourable conditions is 2–4 days, and to spore production, 9 days. Lettuce could be infected artificially but not cabbage, potato, or tomato. The seeds of endive also become heavily infected. The fungus is identified as *A. dauci* (Kühn) Grov. et Skol. f. *endiviae* (Nattr.) n.f. [*A. cichorii*: cf. **32**, p. 645]. For the control of the disease a 3-year rotation is recommended, also spacing at least 30–40 cm. between rows, destruction of diseased plants, seed disinfection in hot water (50° C.) for 20 min., soil disinfection, and spraying with 1% Bordeaux mixture when symptoms first appear.

Verneau (R.). **Segnalazione di Marssonina panattoniana su Cychorium intybus.** [Report of *Marssonina panattoniana* on *Cichorium intybus*.]—*Ric. fitop. Campan.*, **13–14**, pp. 45–48, 1 fig., 1957. [English summary.]

A brief account is given of an outbreak of 'fire' of chicory due to *M. panattoniana* [**36**, p. 574], in Apulia, Italy, Jan. 1955.

Brien (R. M.), Dye (D. W.), Fry (P. R.), Harrison (R. A.), Jacks (H.), & Newhook (F. J.). **Diseases and pests of Lettuce in New Zealand and their control.**—*Inform. Ser. Dep. Sci. industr. Res. N.Z.* 14, 38 pp., 16 fig., 1957.

The diseases described and illustrated, with measures for their control, are the widespread rots caused by *Sclerotinia sclerotiorum* and *Botrytis cinerea*, damping off, both pre- and post-emergence, due to *Pythium* spp. and *Rhizoctonia* [*Corticium*] *solani*, downy mildew (*Bremia lactucae*), and ring spot (*Marssonina panattoniana*) [**23**, p. 323], chiefly on winter lettuce. Bacterial diseases include soft rot (*Erwinia carotovora*) and marginal leaf spot (*Pseudomonas marginalis*), which is not serious. Virus diseases are lettuce mosaic [**32**, p. 7] which may cause 100% loss, [tomato] spotted wilt [**18**, p. 235], in several districts, cucumber mosaic, only recently recorded, and lettuce big vein [**32**, p. 359], of varying incidence and chiefly on winter and spring crops. A concluding section deals with fungicides, formulations for a number of soil and crop treatments being tabulated.

Zink (F. W.), Grogan (R. G.), & Bardin (R.). **The comparative effect of mosaic-free seed and roguing as a control for common Lettuce mosaic.**—*Proc. Amer. Soc. hort. Sci.*, **70**, pp. 277–280, 1957.

In 1955 a comparison was made in California of the effects of roguing commercial lettuce crops affected by mosaic virus [cf. **36**, p. 446] (*a*) by cutting the plant off with a hoe and leaving it in place; (*b*) oil-roguing, i.e. killing the plant with a mixture of contact herbicide and insecticide (diesel oil parathion); and (*c*) roguing the affected plant and one plant on each side in the row by methods (*a*) and (*b*). The 1st roguing was made 7–15 days after thinning; in some plots a 2nd was carried out 7–10 days later, and in others a 3rd, after the same interval.

A single roguing by any of the methods did not significantly decrease the total percentage infection at harvest; roguing twice, however, decreased it significantly. The greatest reduction resulted from 3 roguings with oil (5·8% infection, as against 17·2% for the unrogued), but 3 hoeings were almost as effective (10% infection). The reduction in infection resulting from the use of mosaic-free seed was much greater than that given by any form of roguing, the figures in one trial being:

mosaic-free seed, not rogued, 10·5% infection; commercial seed, not rogued, 83·9%; rogued 78·2–83·5%.

Bancroft (J. B.). **Temperature and temperature-light effects on the concentration of Squash mosaic virus in leaves of growing Cucurbits.**—*Phytopathology*, **48**, 2, pp. 98–102, 1 fig., 1958.

In studies at Purdue University, Lafayette, Indiana, on the possible interaction between light and temperature effects on virus concentration [cf. **32**, p. 168; **36**, p. 135], the concentration of squash mosaic virus was measured spectrophotometrically in the leaves of pumpkin and squash plants grown (*a*) under light of 740 ft.-candles for 20 hr./day at 15·5, 21, 26·5, and 32° C., and (*b*) under 740 ft.-candles for 8 and 20 hr./day and (*c*) for 20 hr. photo-periods under 220 and 740 ft.-candles, both (*b*) and (*c*) at 15·5 and 26·5°.

Virus initially increased most rapidly at high temp., but under (*a*) reached higher concs. for longer periods at the 2 lower temps. Under (*b*) the virus made the greatest initial increase at the higher temp. during long days, but subsequent assays showed no effect of photoperiod on virus content at 26·5°, whereas at 15·5° leaves of short-day plants contained considerably more virus than those of the long-day or those of plants under either photoperiod at the higher temp. The same pattern held under (*c*). The high virus concentration in plants grown at 15·5° under poor light further illustrates that good growth of host and high virus conc. are not necessarily associated [cf. **36**, p. 429].

Goode (M. J.). **Physiological specialization in the Cucurbit anthracnose fungus, Colletotrichum lagenarium.**—*Diss. Abstr.*, **17**, 8, pp. 1642–1643, 1957.

At N. Carolina State College 3 physiologic races of *C. lagenarium* [cf. **31**, p. 542] were demonstrated by inoculation. Race 1 attacked Butternut squash moderately, was severe on all cucumber vars. tested and on susceptible watermelons, and slightly injured Charleston Gray, Congo, and Fairfax watermelons. Race 2 was moderately severe on Butternut squash and highly pathogenic to all watermelon and cucumber vars. Butternut squash was immune from race 3, which occasionally caused only a superficial flecking on the leaves of Congo, Charleston Gray, and Fairfax watermelon seedlings, and was highly pathogenic to all cucumber vars. and to all susceptible watermelons.

The commercial watermelon var. Black Kleckley was resistant to race 1. Some resistance to race 2 was shown by 19 watermelon introductions, and no symptoms appeared on 1 plant of a line (W-695) from S. Africa. Ten citron [watermelon] seedlings were also resistant to race 2.

Individuals highly resistant to race 1 were found in the cucumber introductions PI 197087 and 175111. Two breeding lines, SC 50 A–8 and SC 50 E–4, as well as PI 197087 and 175111 were resistant to race 2. Resistance to race 3 was present in PI 197087, 163213, 175111, and the breeding line SC 50 B–5.

Hildebrand (A. A.). **A Phytophthora root and stalk rot of Soybeans.**—Abs. in *Proc. Canad. phytopath. Soc.*, **25**, pp. 14–15, 1957.

A serious root and stalk rot of soybeans in S.W. Ontario is caused by a fungus tentatively identified as *P. megasperma* [cf. **36**, p. 373]. The first considerable outbreak, in 1954, coincided with the widespread planting of the highly susceptible Harosoy var. Other vars., including Monroe, remained virtually unaffected. The disease is worst from May until mid-July, but can attack and kill plants throughout the growing season. In culture the causal organism grows at 7·5–32·5° C. (opt. 25°). Experimental inoculations showed that certain vars. of snap beans and dry beans [*Phaseolus vulgaris*] and also Lima beans [*P. lunatus*] are susceptible.

Yen (W.-Y.), Chen (M.-J.), & Huang (K.-T.). **Leaf scorch of Peanut (a new disease).**—*J. Agric. For., Taiwan*, **10**, pp. 145–168, 3 pl., 1 fig., 1 graph, 1956. [Chinese. Abs. from English summary. Received Feb. 1958.]

A leaf spot of groundnut described from Taiwan Provincial College of Agriculture is distinct from those due to *Mycosphaerella arachidicola* and *M. berkeleyi*, which commonly occur in Formosa. The margin of the leaf is usually affected first, a yellow spot developing a brown centre and increasing in size until defoliation occurs; perithecia appear on old lesions in Dec.–Jan. The causal fungus, *Leptosphaerulina arachidicola* sp. nov., has perithecia 73·5–91 × 66·5–80 μ, asci 56–71·75 × 29·75–31·5 μ, and ascospores 25–33·25 × 11·25–16·25 μ.

Henner (J.). **Auftreten von Panaschüre an Reben in Österreich.** [Occurrence of mottling on Vines in Austria.]—*Pflanzenarzt*, **11**, 1, p. 13, 1 fig., 1958.

From the Bundesanstalt für Pflanzenschutz, Vienna, the author reports the occurrence, in Nieder Österreich in 1957, of 'mottling' [vine infectious degeneration virus], a new record for Austria.

Kundert (J.). **Die Peronospora der Rebe und ihre Bekämpfung im Jahre 1957.** [*Peronospora* of the Vine and its control in 1957.]—*Schweiz. Z. Obst- u. Weinb.*, **67**, 2, pp. 40–45, 3 graphs; 5, pp. 137–140, 1958.

The annual review of *Peronospora* [*Plasmopara viticola*] attack in the Wädenswil district and comparison of fungicidal treatments [cf. **37**, p. 66].

Ostojić (N.). **Uporedna vrednost organskih i neorganskih fungicida pri suzbijanju plamenjace Vinove Loze.** [The comparative value of organic and inorganic fungicides in the control of downy mildew on Vines.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 38, pp. 21–31, 2 graphs, 1956. [German summary. Received 1958.]

In field experiments by the Faculty of Plant Protection at Radmilov, Yugoslavia, in 1954–5 on the control of *Plasmopara viticola* on vine [**36**, p. 85] the difference between the effects of 2% and 1·5% Bordeaux was so small that the use of 2% is not considered justifiable, except in the final sprays where prolonged protection is desirable.

Of the organic fungicides tested, captan (0·5%) and zineb (0·3%) gave the best results.

Raykov (E.). Нови препарати за борба с маната по Лозата. [New compounds for the control of Vine mildew.]—Бюл. Раст. Защ. (*Bull. Plant Prot., Sofia*), **6**, 1 (9), pp. 51–54, 1957.

In the Pleven Research Institute, Bulgaria, studies on fungicides for the control of downy mildew [*Plasmopara viticola*: **37**, p. 390] on vine showed 0·5% vitigran to be the best, followed by 1% Bordeaux, the former being easier to use. The experiments were made on the Bulgarian var. Bolgar with 12 compounds and 17 formulations.

Peng (F.-Y.) & Chen (T.-W.). **Studies on the control of anthracnose of Grape in the Changli district.**—*Acta phytopath. sinica*, **3**, 2, pp. 193–200, 1 fig., 4 graphs, 1957. [Chinese. Abs. from English summary.]

At Changli Fruit Experimental Station in 1955–6 it was shown that dormant mycelium of *Elsinoe ampelina* [**37**, p. 66] starts to sporulate in May when morning mist or heavy dew occurs; new infections appear in early June, reaching a peak in late June or July; spread lessens after mid-Aug. and ceases in mid-Oct.; young vines are more susceptible than old. Three sprays with 1:0·5:200 Bordeaux, in late May, mid-June, and late June–early July give control.

Sauer (M. R.). **Boron content of Sultana Vines in the Mildura area.**—*Aust. J. agric. Res.*, **9**, 1, pp. 123–128, 1 pl., 1 diag., 1958.

B toxicity becomes apparent when 300 p.p.m. is exceeded in the leaves, which then show brown necrotic spots, initially marginal, becoming confluent, and in serious cases extending inwards in the interveinal areas [cf. **24**, p. 117]. Applications of ammonium sulphate and superphosphate tend to increase B levels, which can be lowered in the area concerned by use of tile drains. Heavy loam soils are particularly affected.

Harris (R. V.). **Plant pathology. Progress in research on Verticillium wilt and virus diseases in Hops in 1957.**—*Rep. E. Malling Res. Sta., 1957*, pp. 22–27; 161–163, 1958. 17*s.* 6*d.*; $2.50.

In this report [cf. **37**, p. 131] covering 1 Oct. 1956–30 Sept. 1957 it is noted that strains of *Pseudomonas mors-prunorum* resistant to more than 4,000 p.p.m. streptomycin were obtained by serial transfer through increasing concentrations of the antibiotic. In a field experiment colloidal Cu was more efficient than streptomycin as a surface bactericide. No better control of cankers was given by a mixture of the two materials than by the Cu alone.

In co-operative trials with the Biochemistry Section (A. N. Gorrod, p. 17) the most toxic of a number of analogues of caffeic acid to *Venturia inaequalis* and *V. pirina* were *o*-coumaric and cinnamic acids, the former probably being the most active.

Further studies on the mechanism of resistance in hop vars. tolerant of *Verticillium albo-atrum* [**36**, p. 126] indicated that the deposition of suberin in the host cell walls may prevent cellulose-destroying enzymes produced by the pathogen from attacking the walls. Complete exclusion of *V. albo-atrum* could not be achieved by this means alone, owing to the zone of immature cells near the root tip which would lack suberin at this stage. Following the death of infected plants, *V. albo-atrum* sporulated over the root surface and occasionally on soil particles adhering to the root, but mycelial growth into the soil was very limited. In inoculations of the susceptible var. Fuggle, wilt symptoms developed more rapidly when bine fragments were used than with spore suspensions and the rate of development was related to inoculum concentration. Conidia of the wilt fungus remained viable in soil for the duration of a 14-day test. Every soil investigated inhibited the germination of conidia [cf. **37**, p. 398]. This inhibition was reduced by heating soil for 1 hr. at 60° C. and by 1% glucose, but not by amendment with 10% activated carbon. On pp. 161–163 the results of the Station's work on *V. albo-atrum* and hop virus diseases are reviewed and discussed for the benefit of hop growers.

In preliminary experiments *Phytophthora cactorum* affected the growth of susceptible apple varieties in infested soil by attacking the fibrous roots without actually causing collar rot. There was a definite seasonal activity of the fungus in the soil.

Transmission experiments with apple star crack virus [cf. **36**, p. 514] on Cox's Orange Pippin suggest that several viruses or strains are involved. Quince stunt virus [**36**, p. 330] was symptomless in apple. A clone of *Prunus serrulata* proved a promising new indicator for [peach] necrotic ring spot virus [cf. **36**, p. 770]. The 1957 yield of Napoleon and Merton Bigarreau trees in a field trial (started in 1953) was reduced by infection with peach necrotic ring spot [**36**, p. 198], [cherry] necrotic line pattern [loc. cit.], and [cherry] rugose mosaic viruses [loc. cit.]. Plum line pattern virus [**36**, p. 705] may be carried symptomlessly by Early Laxton and Shiro plums, previously used as indicators.

Strawberry varieties tolerant of the crinkle virus complex were found suffering from a new disease named yellow crinkle which appears to be distinct and is not transmitted by aphids.

Huitième Congrès International de Botanique, Paris, 1954 [Eighth International Botanical Congress, Paris, 1954], Pierre André (Imprimeur), Paris. **Rapports et Communications parvenus avant le Congrès.** [Reports and Communications received before the Congress], 9 vol., Fr. 8,000, including [7] for section 13, 152 pp., 2 diag., 1 map; [8] sections 18–20, 227 pp., 3 diag.; [9] sections 21–27, 252 pp., 5 fig., 5 graphs, 1954. [Received 1954.]

Comptes Rendus des Séances et Rapports et Communications déposés lors du Congrès. [Proceedings of the meetings and Reports and Communications given at the Congress], 5 vol., including [13] for section 13, 104 pp.; [14] sections 18–20, 119 pp.; [15] sections 21–27, 252 pp., 1 fig., 3 diag., 8 graphs, 1 map, [?] 1956. [Received April 1958.]

The first series [cf. **35**, p. 82] comprises papers submitted before the Conference, the second contains some additional papers and the discussions. Much of the information has already been noticed in this *Review*. In the section on Forest Botany (13), G. Bazzicher [Bazzigher], Zürich, Institut fédéral de recherches forestières, discussed (pp. 112–117) the hosts of *Endothia parasitica* [cf. **33**, p. 569], gave a note on *Endoconidiophora* [*Ceratocystis*] *fagacearum* [cf. **32**, p. 405] causing a new form of oak wilt, reviewed the steps to be taken to control infectious diseases of forest trees (by increasing resistance, by chemical means, and by biological methods), and dealt with recent fundamental researches by various workers on forest phytopathology. D. V. Baxter, University of Michigan, Ann Arbor, described (pp. 117–119) the differential treatment of trees in forests in the west coastal area of N. America, based upon the distribution of important fungi. E. Bjorkman, Skogshogskolan—Experimentalfältet, Sweden, spoke (pp. 119–120) on the physiological yellow-tip disease of spruce [**33**, p. 326] in forest nurseries in Sweden. B. Soegaard, of the Royal Veterinary and Agricultural College Arboretum, Hoersholm, Denmark, described resistance tests against infection by *Didymascella thujina* in *Thuja plicata* [cf. **33**, p. 350]. In vol. [13] brief discussions on these papers are recorded (pp. 47–49). In vol. [7] (pp. 123–138) and [13] (pp. 57–61) there are sections devoted to 11 papers on the physiology of mycorrhizas, including papers by S. A. Wilde, University of Wisconsin, Madison, on the nature and importance of the symbiosis between trees and lower organisms in silviculture ([7] pp. 123–126, in French); by I[da] Levisohn, Bedford College, University of London, on the influence of mycorrhizal mycelium on forest tree seedlings in the absence of mycorrhizal infection (pp. 131–132) [cf. **34**, p. 169; **35**, p. 556]; by Barbara Mosse, East Malling, on the fructifications of a vesicular-arbuscular mycorrhizal fungus [**35**, p. 903] belonging to *Endogone* ([7], pp. 137–138); and by E. Melin, Uppsala, Sweden ([13], pp. 57–61), on recent physiological investigations into mycorrhizal relations in forest trees [cf. **35**, p. 86].

In [8], section 19 on mycology (pp. 35–127) is introduced by a paper by A. Munk, Silkeborg, Denmark (pp. 35–44), dealing with the bases of the systematic relationships of the Pyrenomycetes [cf. **35**, p. 85]. The discussion appears in [14] (pp. 23–24). The section on the physiology of fungi and of heterotrophic plants ([8] pp. 83–120) includes a paper by G. Smith, London School of Hygiene and Tropical Medicine (pp. 83–89) on mould pigments; one by W. H. Schopfer, Institut de Botanique, Université de Berne (pp. 103–110, in French) on growth factors for micro-organisms; and one by A. A. Bitancourt, Victoria Rossetti, and Mirjam Kuczynska, Section de Phytopathologie, Institut biologique, São Paulo, Brazil (pp. 111–112, in French) on growth, morphogenesis, synergism, and nutrient-antagonism in a *Phytophthora* sp. [loc. cit.]. Section 20 on phytopathology (pp. 129–223) includes an account by W. P. K. Findlay, Forest Products Research Laboratory, Princes Risborough, England (pp. 129–132) of the types of rot present in tropical timbers; also a paper by H. S. McNabb, Osborn Botanical Laboratory,

Yale University (p. 133) on variations among isolates of *Fomes annosus* of different geographical and host origin. W. J. Dowson, Botany School, Cambridge, dealt (pp. 175–182) with bacteria pathogenic to the Solanaceae. T. E. Smith, McNair's Yield-Tested Seed Company, Laurinburg, N. Carolina, described (pp. 183–185) experiments on the control of *Pseudomonas solanacearum* on flue-cured tobacco by rotation, chemical treatments of the soil, and the development of resistance. P. A. Ark, University of California, gave a fairly full account (pp. 186–196) of the chief bacterial diseases of economic plants in California [cf. **35**, pp. 496, 615, 810 *et passim*] and their control through knowledge of infection courts and the relationships between plants, climate, and bacteria, and the use of antibiotics. T. H. Thung, Wageningen, Holland, spoke briefly (pp. 198–200) on the problems raised by interferences between plant viruses [**31**, p. 196]. J. M. Wallace, University of California Citrus Experiment Station, dealt (pp. 201–202) with virus strain interference in relation to the symptoms caused by psorosis virus disease of citrus [cf. **32**, p. 428]. L. C. Cochran, Agricultural Experiment Station, Riverside, California, discussed (pp. 202–204) the origin and interaction of forms of the peach mosaic virus [cf. **36**, p. 8]; the use of mild forms as protectants would appear to offer promise of controlling the disease. F. C. Bawden described ([14] pp. 108–110) the morphology of plant viruses, studied with the electron microscope.

Section 22 ([9] pp. 41–42) deals with the prevention of deterioration of materials. It includes a note (p. 41) by G. A. Greathouse & C. J. Wessel, National Academy of Sciences, Washington, D.C., on the United States programme, one by J. M. Leonard (pp. 41–42), Naval Research Laboratory, Washington, on the performances of fungicidal coatings on varnish and lacquer films in a Panama jungle, and one by E. T. Reese & W. Gilligan (p. 42), Pioneering Research Laboratories, Philadelphia, on multiple factors in cellulose hydrolysis. In [15], J. M. Leonard describes (pp. 11–16) experiments on the tropical performances of fungicidal coatings applied to short lengths of cotton-braided wire in a Panama jungle. E. T. Reese & R. G. H. Siu, Philadelphia, dealt (pp. 19–26) with the inhibition of fungal growth on cellulose by adsorbents [cf. **34**, p. 311].

The report also includes sections on lichens (18), medical mycology (19, subsect. 3), bacteria (21), and antibiotics (24).

Plantesygdomme i Danmark 1955. Årsoversigt samlet ved Statens plantepatologiske Forsøg, Lyngby. [Plant diseases in Denmark 1955. Annual report compiled by the State Phytopathological Experiment Station, Lyngby.]—*Tidsskr. Planteavl*, **61**, 4, pp. 561–619, 2 graphs, 1957. [English summary, 12 pp.]

The following information, *inter alia*, is contributed by O. Wagn, M. H. Dahl, H. R. Kristensen, and H. A. Jørgensen to this report, which is prepared on the usual lines [cf. **36**, p. 513]. Loose smut of barley (*Ustilago nuda*) was very widespread but generally mild; var. Weibulls Herta and Carlsberg were the most susceptible, while Pajbjerg Drost, Svaløf Freija, and Proctor sustained the least damage. As in 1954, yellow rust of wheat (*Puccinia glumarum*) occurred in a severe form in many districts, especially on the var. Nord Desprez, cultivation of which has been largely discontinued for that reason.

Exceptionally virulent infection by beet mosaic virus was reported from Fünen, S. Zealand, and Møn. Club root of cabbage (*Plasmodiophora brassicae*) was more troublesome and widely distributed than for many years, causing heavy damage in dry field areas.

Jelly-end rot, a pernicious reaction to drought in potatoes [cf. **34**, p. 812], was observed for the first time in Denmark. Potato wart (*Synchytrium endobioticum*) was notified from 6 new municipalities.

Snapdragons [*Antirrhinum majus*] under glass were attacked by *Peronospora antirrhini*.

Poplars, especially *Populus certinensis*, in shelter belts were heavily damaged by *Fusicladium radiosum* [*Venturia populina*: cf. **37**, p. 252].

Suspected viroses of fruit trees noted for the first time in the country include 'chat fruit' on Lord Lambourne [cf. **24**, p. 280 *et passim*] and rosette on Beauty of Boskoop apples [cf. **33**, p. 487]; bark-split of Charneu pears; prune [plum] dwarf of Victoria and Oullins Reine plums; and necrotic ring spot or a closely related virus on Shade Morello sour cherries. Among other new viroses was a chlorotic spotting, followed by severe mosaic, of the young leaves of various [unspecified] plants in a tomato nursery. No symptoms developed on foliage produced later in the season, but inoculation tests showed that both symptomless as well as affected material harboured a virus; sap inoculation induced local lesions only on *Gomphrena globosa* and *Tetragonia expansa*, while White Burley tobacco, tomato, and *Datura stramonium* developed systemic mottling. The virus is possibly a strain of tobacco ring spot.

A virus from rhubarb leaves with mosaic-like symptoms [cf. **37**, p. 64] was transmitted by sap inoculation to *G. globosa*, *T. expansa*, and White Burley tobacco, all of which reacted with local lesions.

Inoculum from delphinium plants with a chlorotic line pattern, sometimes accompanied by ring-like spots on the leaves [cf. **32**, p. 190], was similarly transmitted to *T. expansa* and tobacco.

Nicotiana glutinosa responded by systemic mosaic to inoculation with sap from leaves of *Trollius europaeus* with chlorotic mottling.

Pyne (C. T.). **Plant pathology section.**—*Rep. Dep. Agric. S. Leone, 1956*, pp. 22–23, [? 1958].

Among the records in this report [cf. **36**, p. 381] are cacao seedling wilt [cf. **37**, p. 203], not previously encountered in Sierra Leone, affecting seedlings of the Ghana vars. T72/F3, T60/F3, and T76/F3, of which the first was the most susceptible. The symptoms were a peculiar ridging and twisting of the stem, with necrotic areas at the leaf apex and margins: the epidermis of the tap-root became pale brown or black and subsequently the cortical tissue decayed. No pathogen has been identified.

A minor leaf spot of banana was caused by *Scolecotrichum musae*. *Cercospora musae* [*Mycosphaerella musicola*: map 7] was identified for the first time in Sierra Leone, at Mokonde, near Njala.

Botryodiplodia theobromae and *Nectria ochroleuca* were associated with a 'wet rot' of the stalks of oil palm fruit bunches at Njala; the fruits were killed before maturity.

Nance (Nellie W.). **Some new and important plant disease occurrences and developments in the United States in 1956.**—*Plant Dis. Reptr*, Suppl. 248, pp. 101–140, 8 maps, 1957.

Compiled on the usual lines [cf. **36**, p. 519], the information in this report has mostly been noticed already.

Kovachevski (I.) & Balevski (A.). Растителната защита в Народна Република Китай [Plant protection in the People's Republic of China.]—Бюл. Раст. Защ. (*Bull. Plant Prot., Sofia*), **6**, 1 (9), pp. 3–29, 1957.

An International Conference for Plant Protection took place in Peking in Aug. 1956. This report describes the institutions responsible for plant protection, the main plant diseases and pests in China and measures for their control, and field organization among growers [cf. **37**, p. 9]. Important diseases noted [*loc. cit.*, *et passim*] include *Sclerospora graminicola*, *Piricularia setariae*, and *Helminthosporium setariae* on foxtail millet (*Setaria italica*), *H. carbonum* on maize, *Colletotrichum*

lineola on sorghum [cf. **29**, p. 535], *C. hibisci* on kenaf (*Hibiscus cannabinus*), *Septoria helianthi* on sunflower, *Phytophthora parasitica* var. *nicotianae* on tobacco, *S. lycopersici* [map 108] on eggplant, *Gloeosporium piperatum* on sweet pepper [*Capsicum annuum* var.], *Sclerotium rolfsii* on fruit trees, *Ustilago esculenta* [**12**, p. 724] on 'cane' ('trestika'), *Pseudomonas* [*Xanthomonas*] *pruni* [map 340] on peaches, and *Polystigma deformans* on apricots. A new virus disease on apple, characterized by rusty patches on the fruit, is named 'yellow dragon'.

Cook (A. H.) (Editor). **The chemistry and biology of yeasts.** —xii + 763 pp., illus., New York, Academic Press Inc. (London, Academic Books Ltd.), 1958. $22.

This useful work comprises a series of contributions by 16 authors on many aspects of yeasts. Special attention may be drawn to the chapter by J. Lodder, W. C. Sloof, & N. J. W. Kreger-van Rij on 'The classification of yeasts' (pp. 1–62) [**31**, p. 567] and to the reviews of the life history, cytology, genetics, and ecology of yeasts, and yeasts in food spoilage [cf. below]. Plant pathogenic yeasts are mentioned on pp. 74–75, 600–601. All sections are well documented and there are author and subject indexes.

Roman (W.) (Editor). **Yeasts.**—246 pp., 4 pl., 13 fig., 5 graphs, The Hague, Dr. W. Junk, 1957. [1,150 refs.] Guilders 25; $7.

This work, the first of a new series of monographs, 'Biologia et Industria', designed to link the biological sciences with related industries, contains 6 chapters. The first, with sub-chapters, by M. Pyke, W. J. Nickerson, and A. S. Schultz, largely covers the cytology and biochemistry of yeast in general [cf. above], with special reference to baker's yeast and its production. Succeeding chapters deal with brewer's yeast (by R. S. W. Thorne), wine and fruit yeasts (by H. Schanderl), saké and similar yeasts (by K. Arima), food and fodder yeast (by A. C. Thaysen), including a detailed account of its industrial production, and yeast preparations, including medicinal and nutritional yeasts and those used for technical purposes (by M. Pyke). Each chapter concludes with a list of references.

Smith (A. H.). **The Mushroom hunter's field guide.**—197 pp., 157 fig., Ann Arbor, University of Michigan Press, 1958. 40*s*.

Over 120 species of edible and poisonous fungi are illustrated by black and white photographs. Simple keys are provided to each group, and for each species there is information on when and where to find it, important field characteristics, and edibility. The guide is intended mainly for the Great Lakes region and the western and north-eastern United States.

Goto (M.). **Recent development in the classification of phytopathogenic bacteria. I. The peritrichous, soft-rot bacteria. II. Gram negative organisms with polar flagella.**—*Ann. phytopath. Soc. Japan*, **21**, 2–3, pp. 92–96 [53 refs.]; 4, pp. 194–200 [27 refs.], 1956. [Japanese, English, and Latin. Received 1957.]

This is a review of the recent interpretations of the genera of bacteria and their present status.

Horikoshi (K.) & Iida (S.). **Lysis of fungal mycelia by bacterial enzymes.**—*Nature, Lond.*, **181**, 4613, pp. 917–918, 1 fig., 2 graphs, 1958.

At the College of Agriculture, University of Tokyo, the authors investigated a strain of *Bacillus circulans*, isolated from soil, which lysed *Aspergillus oryzae* [cf. **36**, p. 125]: when inoculated into a flask culture of the fungus in Czapek-Dox medium, which had been shaken for 24 hr. at 30° C., the bacterium brought about the almost complete disappearance of mycelium after a further 80 hr. shaking at this temperature.

A study of the degradation of cell wall material (prepared by use of a Waring blender) by a crude enzyme preparation from the bacterium indicated that it acted directly on the cell wall. The enzyme also acted on living mycelium of *A. aojae*, *Pen*[*icillium*] *purpurogenum* var., and *Mucor* M-5, but not *Rhizopus* R–1–8.

Husain (A.) & Kelman (A.). **Relation of slime production to mechanism of wilting and pathogenicity of Pseudomonas solanacearum.**—*Phytopathology*, **48**, 3, pp. 155–165, 3 fig., 1958. [29 refs.]

The results of this investigation, in which Bottom Special tobacco and Rutgers tomato plants were used as hosts of the bacterium, have already been noticed [**37**, p. 527].

Bortels (H.). **Ungeklärte Umgebungseinflüsse auf die Vermehrungsfähigkeit aerober Bakterienzellen.** [Unexplained environmental influences on the reproductive capacity of aerobic bacterial cells.]—*Zbl. Bakt.*, Abt. 2, **111**, 6–7, pp. 218–226, 3 graphs, 1958.

The wide fluctuations in the number of cells capable of reproduction in 24-hr.-old populations of *Pseudomonas tabacum* are attributed to the operation of external factors [cf. **32**, p. 210], which may be modified temporarily by protection of the cultures with sheets of aluminium (0·07 mm. in thickness), copper (0·7), or lead (13). Hence it is inferred that constituents of the so-called 'weather radiation' are responsible for 'spontaneous' inactivations of this kind. Temporary reactivation or protection against further damage in the subsequent development of single cells into colonies was attainable by the admixture with the synthetic nutrient medium of 0·02% yeast autolysate as well as by covering the Petri dishes with 15 mm. glass as a ray-absorber.

Knösel (D.) & Günther (Ingeborg). **Zur Karyologie der Bakterien. Fortgeführte elektronen optische Studien an Agrobacterium-Arten.** [On the cytology of bacteria. Further electron optic studies on *Agrobacterium* species.]—*Zbl. Bakt.*, Abt. 2, **111**, 6–7, pp. 162–168, 9 fig., 1958.

Further studies on bacterial cytology at the Institut für Pflanzenschutz, Stuttgart-Hohenheim, Germany, again yielded no evidence for the occurrence of mitosis (as observed in higher organisms) in *Agrobacterium radiobacter*, *A. stellulatum*, and *A. tumefaciens* [**35**, p. 817]. An analogous process does, however, take place, involving differentiation of the nuclear substance first into 3 and after subsequent expansion and division into 6 granules. Three of each 6 fuse and produce daughter nuclei. So far, these observations have been practicable only at the close of the logarithmic phase of growth.

Szabadi (L.). **Über Immunverhältnissen pflanzlicher Tumoren.** [On the immunity relationships of plant tumours.] –*Naturwissenschaften*, **45**, 7, p. 169, 1958.

The results of previous studies by the author *et al.* (*Arch. int. pharmacodyn.*, **90**, p. 93, 1952) indicated that an anti-histamine-active substance found in plant galls represents a defensive mechanism aimed at inhibiting the growth of the tumours. It has long been known that the neoplasms induced by *B.* [*Agrobacterium*] *tumefaciens* are generally unable to develop in the vicinity of an existing tumour, but opinions are still divided as to how this immunity is acquired. Further experiments towards the solution of the problem were made at the Lungenheilanstalt der ungarischen Staatseigenbahnen (MAV), Budapest.

Three weeks after intraperitoneal and subcutaneous inoculation of rabbits with a suspension of the bacterium grown for 72 hr. on the synthetic medium of Braun *et al.* (*Cancer Res.*, **2**, p. 9, 1942) an antibody titre of 1:625 was reached. An aqueous tumour extract was similarly applied to immunize a 2nd group of rabbits

and both the antisera were used for tests on tomatoes, the stems of which were scarified and inoculated with a suspension of 0·1 ml. of a 72-hr.-old culture alone (group I), or plus an equal volume of high titre serum (II), normal serum (III), or tumour extract serum (IV).

Normal tumour growth occurred in groups I and III, but none developed in II and IV, results which are considered to support the hypothesis of the existence in plants of a defensive reaction analogous to that in animals.

Paris (Denise) & Duhamet (L.). **Sur un cas de sensibilité des tissus de crown-gall de Scorsonère à l'acide indole acétique.** [On a case of sensitivity of *Scorzonera* crown-gall tissues to indole-acetic acid.]—*C. R. Acad. Sci., Paris*, **246**, 13, pp. 2023–2025, 1958.

Young tissues of *Scorzonera* [*hispanica*] infected by crown gall [*Agrobacterium tumefaciens*: **36**, p. 519; **37**, p. 72] when cultured on Knop's solution are insensitive to indole-acetic acid, but after 2 months or so those grown on the same medium +KCl proved to be sensitive to its stimulatory action.

Steinhaus (E. A.). **Concerning the harmlessness of insect pathogens and the standardization of microbial control products.**—*J. econ. Ent.*, **50**, 6, pp. 715–720, 1957.

Although the micro-organisms pathogenic to insects and used as active ingredients in microbial control products [**35**, p. 184] are generally innocuous to man, animals, and plants, it is considered advisable, in the interests both of the public and of manufacturers, that such products should be subject to appropriate State and Federal regulations. The relevance of existing laws and regulatory acts to manufacture and distribution is discussed and provisional methods of standardizing microbial insecticides and ensuring safety standards for them are suggested.

Kondakova (Mme E. I.). Хищные грибы в Подмосковие. [Predacious fungi in the Moscow suburbs.]—Докл. Акад. сельскохоз. Наук Ленина [*Proc. Lenin Acad. agric. Sci.*], **23**, 3, pp. 28–33, 1958.

Isolations from 110 soil samples obtained near Moscow, U.S.S.R., yielded 14 fungi predacious on nematodes, their activity being greatest at pH 6·5–7. A mixture of equal quantities of spores of *Arthrobotrys dolioformis*, *A. kirghizica*, *A. arthrobotryoides* var. *indolens*, *A. superba* [**32**, p. 125], *Trichothecium pravicovi*, and *T. globospora* var. *microspora*, introduced 30 days before planting cucumber seedlings in soil at pH 7·8 and 43·3% moisture (initially), increasing to 70%, reduced the nematode (*Meloidogyne marioni*) population by 33%. Better results are being obtained in experiments with more than 1 application.

Nirula (K. K.). **Observations on the green muscardine fungus in populations of Oryctes rhinoceros.**—*J. econ. Ent.*, **50**, 6, pp. 767–770, 1957.

The natural incidence of infection of *Orycetes rhinoceros* by *Metarrhizium anisopliae* var. *rhinoceros* [cf. **34**, p. 646] was investigated at the Central Coconut Research Station, Kayangulam, S. India, during 1956. The maximum prevalence (4·5–11·5% in larvae, 4–8 in pupae, and 5–10 in adults) was recorded from May–Oct., when the humidity exceeded 70%, the temperature was about 27° C., and the sky was overcast for more than half the period. It is concluded from these observations that the initiation of epizootics of the green muscardine disease might well be effected by artificial dissemination of *M.a.* var. *rhinoceros* during the S.W. monsoon on the W. coast of India.

Ribaldi (M.). **Sulla presenza di particolari fruttificazioni di Actinomucor corymbosus (Harz) Naumov in un termitaio a Spello (Perugia). I. Alcune osserva-**

zioni sull' aspetto naturale e colturale del fungo. [On the presence of special fructifications of *Actinomucor corymbosus* (Harz) Naumov in a termites' nest at Spello (Perugia). I. Some observations on natural and cultural aspects of the fungus.]—*Note sper. Ent. agr.* 9, 32 pp., 8 pl., 1 fig., 1956. [German and English summaries. 57 refs. Received March 1958.]

A. corymbosus, new for the fungal flora of termitaria (*Reticulitermes lucifugus*), appears to be a source of vitamins and proteins, especially for young termites. Microsporangia are described for the first time.

NEERGAARD (P.). **Sprøjtning af frugttræer, frugtbuske, køkkenurter og blomster og anden bekæmpelse af haveplanternes sygdomme og skadedyr. 4. forøgede udgave.** [Spraying of fruit trees, small fruits, vegetables, and flowers and other methods of combating the diseases and pests of horticultural plants. 4th enlarged edition.]—173 pp., 81 fig., J. F. Clausens Forlag, Copenhagen, 1958.

The present edition of this useful treatise contains new chapters on the symptoms and causes of various pathological conditions and one entitled 'general observations on spraying', besides many changes necessitated by the extensive post-war production of new chemicals.

Specialpræparater anerkendte af Statens Forsøgsvirksomhed i Plantekultur til bekæmpelse af plantesygdomme og skadedyr. Gyldig for året 1958. [Special preparations approved by the State Experimental Service in Plant Cultivation for the control of plant diseases and pests. Valid for the year 1958.]—*Tidsskr. Planteavl*, **61**, 5, pp. 823–845, 1958.

The current list of plant protectives officially approved for use in Denmark [cf. **36**, p. 539] is presented in an altered form, the chemicals being listed in alphabetical order within the several groups, and various abridgments are employed in the descriptive and analytical observations as well as in the names of manufacturers. Moreover, the recommended dosages are expressed in wt./ha. instead of, as hitherto, percentage/800–1,000 l./ha.

HAMMARLUND (L.). **Afprøvning af plantebeskyttelsesmidler 1957.** [Evaluation of plant protectives 1957.]—*Tidsskr. Planteavl*, **61**, 5, pp. 854–864, 1 fig., 1958. [English summary.]

Severe outbreaks of potato blight [*Phytophthora infestans*] occurred during the official Danish fungicide trials [cf. **36**, p. 601] in 1957. The most effective treatments resulted in increased tuber yields of 90–100 hkg./ha. Newly approved preparations include a few ordinary zineb and copper compounds and one containing dichlone, also used as a seed dressing.

Unlike other copper compounds, amerko, a combination of copper and mercury, caused no russeting of apple fruits on trees treated against scab (*Venturia inaequalis*) before bloom, whereas dikathane (zineb+karathane) and crag were responsible for such damage.

Severe infection by apple mildew (*Podosphaera leucotricha*) was controllable only by karathane or wettable sulphur, but milder outbreaks yielded to combinations of thiram or captan with sulphur.

Captan and 2 types of tillantox (formerly cerenox) were approved as seed dressings for peas [against damping-off of unspecified origin].

SCHNICKER (J. L.). **Kemikaliekontrollen i finansåret 1956–57.** [Inspection of chemicals in the financial year 1956–57.]—*Tidsskr. Planteavl*, **61**, 5, pp. 865–904, 1958.

This report is on the usual lines [cf. **35**, p. 309].

Vekemanz (J.). **Méthodes de lutte contre les ennemis du Tabac et de la Pomme de terre.** [Control methods for the enemies of Tobacco and Potato.]—*Bull. Inform. Inst. Étud. agron. Congo belge*, **7**, 1, pp. 1–29, 12 fig. (6 col.), 2 diag., 1958.

In the light of the experience gained in studies at the Laboratoire de Phytopathologie de la Station d'Essais, Kaniama, Belgian Congo, the author reviews in some detail the control of tobacco and potato diseases and pests in the station area [**33**, p. 413]. The subject is treated under the headings: phytopharmaceutical applications in general (sprays, dusts and their application, and soil fumigation), the treatment of the chief fungal, virus, and bacterial diseases affecting tobacco and the potato locally, and the care of tubers in storage.

The diseases of tobacco encountered are due to *Alternaria longipes* [map 63], *Cercospora nicotianae* [map 172], *Pseudomonas tabacum*, *Erysiphe cichoracearum*, tobacco mosaic virus, and rosette [tobacco mottle and vein-distorting viruses: **26**, p. 318]. The potato diseases are caused by *A. solani* and *P. solanacearum* [map 138], the latter being serious in the district.

Wright (D. M.). **The pattern of low volume orchard spraying.**—*Agriculture, Lond.*, **64**, 12, pp. 593–595, 1 pl., 1958.

In this general note it is observed that current research in the U.S.A. has shown the need for double the amount of low-volume spray to enter the top quarter of the tree compared with the bottom in order to ensure complete penetration; some new machinery has been designed accordingly. If the drops are too small they cannot overcome the airflow of the wind round the leaf-surface, and if too large they tend to leave the airstream from the machine before proper penetration is achieved. The most practicable volume for general orchard work appears to average 30 gal./acre, this giving the best spray pattern when the machine produces a mist with an air vol. around 6,000 cu. ft. air/min. for single-sided application or double this for spraying both sides at once, ejected at a speed of 110 m.p.h.

Cuillé (J.) & Guyot (H.). **Le matériel de traitement, son utilisation.** [Apparatus for spraying, its utilization.]—*Fruits d'outre mer*, **12**, 11, pp. 461–475, 11 fig., 7 graphs, 1957.

In this further detailed study [cf. **34**, p. 657] of the mechanical spraying of banana [**37**, pp. 362, 492] and other plantations the authors deal with the problem of defining the min. droplet size in a cloud in relation to the deposit required, the crop to be treated, the prevailing atmospheric conditions, and the quality of the pesticide used.

Part I is devoted to the question of how different types of machine may be adjusted in order to produce droplets of the required size; the mathematical principles involved are outlined. The apparatus in use is of 3 types: pneumatic and rotary sprayers and thermo-aerosol machines. In the pneumatic sprayers the most important factor is the combination of air and liquid, average droplet size being related to airflow and the liquid used. The setting of the sprayer, its rate of progress, and the distance to be covered in each traverse must be arranged in relation to each other, the physical properties of the liquid, and especially its viscosity, all influencing the type of cloud produced. The deposition on the leaves must be examined to ensure correctness and constancy.

Rotary sprayers, the first to be used on banana plantations, employ a perforated disk or cylinder, turning at great speed, which ejects the liquid introduced at its centre. An air current is produced either by a turbine or, with aircraft, merely by the displacement of the machine; a very homogeneous cloud is produced, the density of the liquid and its surface tension having but slight influence on its characteristics when the petroleum products usually employed in banana plantations are used.

Certain of the physical and chemical factors involved in aerial spraying, including the 'resistance to dislocation' of oils, are outlined.

With thermo-aerosol machines the air current is raised to a temp. of 350–700° C., either by combustion of petrol vapour, as in the Tifa, or by use of the exhaust, as in the Solo. The Swing fog and Pulsavia utilize the fuel combustion both to heat the system and provide the air jet for atomization. All these machines produce the extreme division of the liquid suitable for fogging, especially light fogging, with a droplet diam. below 25 μ.

In Part II several examples are given of treatment by the different machines used for the low-volume process. Fogging is designed to protect crops from attack by insects in the air. In absolutely calm air the cloud should hover for about $\frac{1}{2}$ hr. in order to settle. Variations of the fine mist technique described in an earlier paper [**36**, p. 40] have been introduced to meet changing conditions encountered in the field. Knapsack pneumatic and rotary sprayers, using about 20 l./hr., produce a cloud composed of droplets of 50–200 μ (average 85 μ), with a deposition of 200–500 droplets/cm^2. Pneumatic sprayers, however, produce a clearly defined jet which should not be allowed to reach vegetation at short range before dispersing, otherwise it will cause scorching.

The authors consider that progress in the development of spray materials is lagging behind the advances made in the applicators.

Cuillé (J.) & Blanchet (B.). **Les huiles de traitements, leur phytotoxicité.** [Oils for spraying, their phytotoxicity.]—*Fruits d'outre mer*, **13**, 2, pp. 53–65, 5 fig., 1 graph, 1958.

The 1st part of this study of low-volume spray treatment of banana plantations [see above] is a critical analysis of the physico-chemical properties of agricultural oils and their influence on the physiology of plants. The 2nd part, dealing with their phytotoxic effects, gives the results of 42 series of tests with 84 different oils on potted maize plants. Normal oil deposits from spraying are not detrimental to maize, nor to banana; phytotoxicity results only from excessive quantities.

Three factors appear decisive, the quantity of oil applied, its properties, and the ambient conditions. The effects of different oils are comparable only when the deposits are equal. A deposit of 100 parts with an oil of viscosity 1·78° Engler will be reduced to 29·6 with one of 10·7° E., giving a variation in growth reduction in the case of a phytotoxic oil from 34% to nil. On maize, even with a markedly phytotoxic oil, a depression of growth occurred only with deposits of some 700–1,600 μg./cm.^{2}, repeated every other day, deposits similar to those obtained by immersing the leaf in oil. Deposits obtained with normal atomization, 20–100 μg./cm.^{2}, were non-toxic.

The principal factors influencing the resistance of young plants are temperature, humidity, and the light. Increases of 4–5° C. favour penetration by lowering viscosity. Plants treated in a dry atmosphere tend to wilt much more rapidly than they would normally. Growth of maize was found to be affected by a phytotoxic oil only in the light. A study of the modifications in acidity of the oil after exposure to light rich in ultra-violet showed that after 4 hr. the acid content changed from 0·18–0·7 (mg. K_2O), while 0·24 is the limit generally accepted in agricultural oils.

For practical purposes medium or light medium agricultural oils for low-volume spraying should have the following properties: a viscosity of 4–7° E. at 20° (min. 3° E. at 30°); a density of 0·83–0·93 (if possible under 0·9); 50% distilling between 325 and 340° max.; evaporation less than 20% by Lallata's test; sulfonation index (U.N.R.) 85–90% min.; aromatic content below 10–12%; a paraffin or naphthalene base; acidity less than 0·16 (in K_2O); and absence of any traces of S compounds.

Parris (G. K.). **Soil fumigants and their use : a summary.**—*Plant Dis. Reptr*, **42**, 2, pp. 273–278, 1958.

This review from Mississippi State College covers briefly soil fumigants in general and gives descriptions of the constitution and application of 10 in common use, some of which are fungicidal as well as effective against soil pests.

Munnecke (D. E.). **A biological assay of nonvolatile diffusible fungicides in the soil.**—*Phytopathology*, **48**, 2, pp. 61–63, 1 graph, 1958.

From the University of California, Los Angeles, a method is described whereby plugs of soil, treated with the fungicide to be tested, are placed on potato-dextrose agar previously seeded with spores of *Myrothecium verrucaria* at approx. 250 spores/ml. The width of the clear zone round a plug after 48 hr. gives a quantitative index of the conc. of the fungicide.

Uhlenbroek (J. H.), Koopmans (M. J.), & Huisman (H. O.). **Investigations on agricultural fungicides. I. Trichloromethyl thiolsulphonates.**

Uhlenbroek (J. H.) & Koopmans (M. J.). **II. Compounds structurally related to trichloromethyl thiolsulphonates. III. The reaction between trichloromethanesulphenyl chloride and benzoic acid.**—*Rec. Trav. chim. Pays-Bas*, **76**, 2, pp. 129–146, 1 graph; 7, pp. 657–665, 1 graph; 7, pp. 666–668, 1 graph, 1957.

The 1st paper, from the Central Research Laboratory, Weesp, and the N. V. Philips-Roxane Laboratory, 's Gaveland, Netherlands, describes the preparation and biological properties of 41 compounds of the type RSO_2SCCl_3. Preliminary spore germination experiments with *Fusarium culmorum* showed that all the compounds were strongly fungitoxic and that the R-group had little effect on this toxicity, but most of the compounds were phytotoxic (as determined by spraying on broad bean, *Phaseolus vulgaris*, and *Tropaeolum majus*), though this could be strongly influenced by varying the R-group, for example by introducing trichloromethyl benzenethiolsulphonate into the phenyl group or by introducing a (substituted) phenoxy group into the β position of the aliphatic chain.

Two of these non-toxic derivatives, the *p*-acetylamino (F14) and the *p*-carboxy (F54) were selected for further investigation, in which 7 fungi were given spore germination tests. All were totally inhibited by both compounds at concs. of 5 and 8 p.p.m. Field trials are now in progress.

The 2nd paper reports the preparation and fungitoxic properties of some thiosulphonic esters and some reaction products of trichloromethanesulphenyl chloride with thiosulphonic acid salts and with thiophenols. Within the thiosulphonate group max. fungitoxicity is shown by the trichloromethyl ester but the presence of the $—CCl_3$ group is not essential.

In the 3rd paper a new fungitoxic compound, benzoic trichloromethanesulphenic anhydride, is described.

Grossmann (F.). **Untersuchungen über die innertherapeutische Wirkung organischer Fungizide. I. Thiocarbamate und Thiurame.** [Studies on the internal therapeutic effect of organic fungicides. I. Thiocarbamates and thiurams.]—*Z. PflKrankh.*, **64**, 12, pp. 718–728, 1957.

At the Institut für Pflanzenpathologie und Pflanzenschutz, University of Göttingen, 9 fungicides of the thiocarbamate-thiram group were examined for systemic fungicidal activity in Bonny Best tomato. The plants were raised in sand culture with Hoagland's medium, to which the fungicides, in solution or suspension in acetone, were applied. Inoculation of *Fusarium oxysporum* f. [*F. bulbigenum* var.] *lycopersici* was secured by clipping the roots back and dipping in a homogenized culture suspension; *Alternaria solani* and *Phytophthora infestans* were sprayed on to the foliage. *Fusarium* wilt was reduced by pre- but not post-infection treatments

with compounds of the dimethyldithiocarbamate group, including thiram, which caused severe phytotoxic effects. By contrast the ethylenebisdithiocarbamates (including polyethylenethiuram disulphide), causing at most minor phytotoxic effects, were ineffective. None of the compounds inhibited *A. solani*, but most of them significantly reduced *P. infestans* infection.

As no fungitoxic activity was demonstrable in sap exuding from cut shoots the author assumes that the fungitoxic effects observed were attributable to changes in host metabolism. The results with *Fusarium*, taken in conjunction with differences in the degree and type of toxicity, confirm the conception that the action of the dimethyldithiocarbamates is different from that of the ethylenebisdithiocarbamates.

Durkee (A. B.). **Fungitoxicity of some substituted pyridines and quinolines related to 8-quinolinol (oxine).**—*J. Fd agric. Chem.*, **6**, 3, pp. 194–196, 1958.

Using the spore-drop germination method of the American Phytopathological Society [**22**, p. 489], the author tested 8-quinolinol (oxine) and 9 structurally related heterocyclic compounds for toxicity to *Monilia* [*Sclerotinia*] *fucticola* at the Dept of Agric., London, Ontario. The most toxic were 8-quinolinol itself and its 2-methyl derivative, with ED_{50} at 0·3 and 11·4 p.p.m., respectively. Some toxicity was exerted by quinaldic and 8-hydroxyquinaldic acids (137 and 178 p.p.m., respectively), but none of the pyridine derivatives was active against *S. fructicola*.

A combination of lipoid solubility and chelation ability was related to toxicity, but definite evidence was secured that chelation with Cu to form water-soluble salts was no guarantee of toxicity in either the compound itself or its Cu salt.

Blattný (C.). **Současný stav a úkoly československé fytopathologické mykologie.** [The present situation and tasks for Czechoslovak phytopathological mycology.]—*Čes. Mykol.*, **10**, 3, pp. 136–140, 1956.

A review of the past work of Czechoslovak mycologists and plant pathologists and an account of contemporary endeavours in these fields.

Tikhonov (N. P.). Защита растений в Корейской Народно-Демократической Республике. [Plant protection in the People's Democratic Republic of Korea.]—Защ. раст., Москва [*Plant Prot., Moscow*], *1957*, 4, pp. 47–48, 1957.

A section of the Ministry of Agriculture deals with plant protection in N. Korea and in 1956 quarantine regulations against plant diseases were established. Some 340 diseases have been recognized; 23 on cereals, 32 on fruit, and 28 on legumes being the most prevalent. Control methods are adapted from the U.S.S.R. and other countries. There are some modern research stations and appropriate literature is widely distributed [cf. **37**, p. 442].

Martin (G. W.). **Mycological taxonomy as related to practical problems in microbiology.**—*Mycologia*, **50**, 1, pp. 97–102, 1958.

In this paper read to the Society for Industrial Microbiology at Stanford University the desirability of closer co-operation between experimental and taxonomic mycologists is emphasized.

Buxton (E. W.). **Problems of plant wilt diseases.**—*Agric. Rev.*, **3**, 7, pp. 28–35, 3 fig., 1957. [15 refs.]

This useful survey presents up-to-date information under the headings of *Verticillium* wilt, *Fusarium* wilt, wilt problems in Britain, research problems, and control methods. Particulars of the geographical distribution, 1st records, and varietal reactions are shown in tabular form for 24 common wilts of the 2 groups.

Farkas (G. L.) & Király (Z.). **Enzymological aspects of plant diseases. I. Oxidative enzymes.**—*Phytopath. Z.*, **31**, 3, pp. 251–272, 1958. [138 refs. German summary.]

This contribution from the Research Institute for Plant Protection, Budapest, Hungary, deals specifically with the behaviour of oxidative enzymes in diseased plants and discusses their possible role in host-parasite relations [**37**, p. 224], which in most of the cases examined were connected not only with the quantitative but also the qualitative changes in the carbohydrate breakdown. A number of examples are quoted from the literature demonstrating that the polyphenol–polyphenoloxidase system plays a protective role.

Martin (H.). **Chemical aspects of ecology in relation to agriculture.**—*Publ. Dep. Agric. Can., Sci. Serv.*, 1015 (*Res. Monogr. Sci. Serv. Lab.*) *1957*, 96 pp., Queen's Printer, Ottawa, 1958. [468 refs.] $3.00.

This book classifies and correlates information on the chemical factors involved in the symbiotic and antibiotic relations between plants, insects, the microflora, and the soil. The chapters include information on the production of phytotoxins by higher plants; the chemical defences of higher plants against attack by fungi and bacteria; the rhizosphere; the role of phytotoxins in plant pathology, with reference to alternaric acid, diaporthin, fusaric acid, gibberellins, lycomarasmin, pectolytic enzymes, and mycorrhizal relationships; the chemical basis of biological control, with reference to gliotoxin, griseofulvin, gladiolic acid, actidione, and trichothecin; the ecological and practical significance of fungal antagonism; the practical utilization of fungicidal antibiotics; and the ecological chemistry of bacteria.

Reichert (I.). **Fungi and plant diseases in relation to biogeography.**—*Trans. N.Y. Acad. Sci.*, Ser. II, **20**, 4, pp. 333–339, 3 maps, 1958. [14 refs.]

Taking *Sclerotinia sclerotiorum* (a temperate ecological type) as an example, the author demonstrates that plant pathogenic fungi are subject to the same biogeographical factors which govern the distribution of higher plants [**35**, p. 90]. A study of such factors in relation to fungi might be designated 'mycogeography', and that of plant diseases 'phytopathogeography'.

By means of the 'phytopathogeographical' method the ecological character of a pathogen may be determined and conclusions drawn as to the possibility of its control by predictions of its likely occurrence and by selection of localities and periods least favourable to its development.

Finally, determination of the original (paleogenetic) centres of a given pathogen may lead to the discovery of resistant host varieties, as well as of antagonistic organisms.

Ferguson Wood (E. J.). **The significance of marine microbiology.**—*Bact. Rev.*, **22**, 1, pp. 1–19, 2 fig., 2 graphs, 1958. [133 refs.]

Included in this comprehensive survey are references to the depredations of pathogenic micro-organisms in the sea [**26**, p. 308], including the elimination of *Zostera marina* [**26**, p. 162] beds by *Labyrinthula* [*macrocystis*].

Gray (R. A.). **The downward translocation of antibiotics in plants.**—*Phytopathology*, **48**, 2, pp. 71–78, 1 diag., 1958.

At the Merck, Sharp, and Dohme Laboratories, Rahway, New Jersey, 1% streptothricin and 1% pleocidin (*Antibiotics & Chemotherapy*, **2**, pp. 307–310, 1952), sprayed on the primary leaves of Pinto beans (*Phaseolus vulgaris*) were translocated to the expanding first trifoliate leaves and protected them from injury by *Xanthomonas phaseoli* inoculated subsequently by rubbing. Upward movement of

streptothricin occurred in tomato and bean when the antibiotic was supplied to the roots in nutrient solution, and in bean when it was sprayed on the lower part of the stem [cf. **34**, p. 311]. In bean and tobacco translocation of both antibiotics upwards and downwards from intermediate leaves sprayed with 1% solutions was demonstrated by bioassay of the leaves.

Immersion of a primary bean leaf in 1,000 p.p.m. streptothricin resulted in translocation to the roots and also to younger leaves, assayed 2–5 days later. The younger leaves were protected from *X. phaseoli* completely when the antibiotic was applied thus at the time of inoculation, but there were 1,210 lesions on 12 treated leaves compared with 4,630 on 12 untreated when it was applied 2 days after inoculation. Translocation of several other antibiotics occurred when they were applied in this manner, though not as sprays.

The downward translocation of streptothricin and pleocidin through steam-killed sections of petioles and stems was demonstrated by the immersion method, indicating that movement takes place via the xylem.

Evidence was obtained that streptomycin amine and streptomycin oxime were converted in the plants to compounds with greater antibacterial activity than the original materials.

Hilton (C. L.). **The identification and estimation of phenolic fungicides in mildew-proof materials.**—*Text. Res. J.*, **28**, 3, pp. 263–266, 12 graphs, 1958. [10 refs.]

Details are given of an ultra-violet spectrophotometric method developed at the U.S. Rubber Company, Research Center, Wayne, New Jersey, for the analysis of commercial phenolic fungicides used against [unspecified] textile moulds. Accuracy and precision of ±3% have been obtained. A table is given showing the ultra-violet absorption spectra of 12 compounds (30 commercial products), including various forms of preventol and dowicide.

Législation phytosanitaire des territoires de l'Union française (A.O.F., A.E.F., Cameroun, Togo, Madagascar, E.F.O., Nouvelle-Calédonie, pouvoir central). [Phytosanitary legislation in the territories of the French Union (A.O.F., A.E.F., Cameroons, Togoland, Madagascar, E.F.O., New Caledonia, Central Power).]—*Agron. trop., Nogent*, **12**, 6, pp. 735–763, 1957.

Lists are presented in tabular form of the different types of legal document relating to plant health, dates of publication (up to 1 Jan. 1957), and a statement of contents for the various territories of the French Union, together with cross-indexes under crops and other subjects.

Melin (E.) & Nilsson (H.). **Translocation of nutritive elements through mycorrhizal mycelia to Pine seedlings.**—*Bot. Notiser*, **111**, 1, pp. 251–256, 1958.

Further experiments at the Institute of Physiological Botany, Uppsala, Sweden [cf. **36**, p. 716], showed that the movement of P^{32} from mycorrhizal mycelium of *Boletus variegatus* to *Pinus sylvestris* in intact mycorrhiza [**35**, p. 86] is greatly affected by the transpiration of the tree seedling. In seedlings with attached aerial parts the rate of translocation was several times higher than that in decapitated ones under the same conditions.

Gupta (S. C.). **Studies in pectic enzymes of parasitic fungi. I. Secretion of protopectinase enzyme by Pythium de baryanum Hesse on different Potato media.**—*Proc. Indian Acad. Sci.*, Sect. B, **47**, 1, pp. 43–47, 1958.

At the Botany Dept, D.S.B. Govt. College, Nainital, both potato decoction and sap extracted from frozen potato tubers were found to be suitable for protopectinase production by *P. debaryanum* [**35**, p. 385], sap especially so, as it can be diluted to half strength without losing its quality. Enzyme production was not related to mycelial growth.

Christie (T.). **Nutritional studies of Phytophthora cactorum (Leb. and Cohn) Schroet. I. Utilization of nitrogen and carbon compounds.**—*N.Z. J. Sci.*, **1**, 1, pp. 83–90, 1958.

At the Cawthron Institute, Nelson, the best sole sources of organic N for increase in mycelial weight of *P. cactorum* isolated from a dead hop plant [**36**, p. 211] when dextrose was the C source and the pH of the medium was not adjusted were arginine, histidine, and threonine, but with the initial pH adjusted to 6·5 they were histidine, pepsin, and arginine. Calcium nitrate was the best source of inorganic N in both cases [cf. **36**, p. 205]. Sucrose and maltose were the best of 9 compounds tested as sources of C when $NaNO_3$ was the N source. Substitution of $(NO_3)_2$ in the basal medium by the sulphate, oxide, carbonate, or acetate produced, respectively, some, slight, minimal, and no fungal growth. $FeSO_4 7H_2O$ at 4 p.p.m. in the basal medium depressed growth.

Katsura (K.). **Studies on the physiology of sporangial germination of Phytophthora capsici Leonian. 2. Influence of sucrose and glucose upon the two types of germination and plasmolysis of zoosporangia.**—*Sci. Rep. Fac. Agric. Saikyo Univ.* 9, pp. 45–52, 1 fig., 1 graph, 1957. [Japanese. Abs. from English summary.]

In further studies [cf. **37**, p. 144] normal indirect germination was observed in 0·01, 0·05, and 0·1 M glucose and sucrose sols., being somewhat less at 0·25 and inhibited at 0·5. Direct germination, however, was little affected by concentration. Indirect germination was notably decreased in potato media or potato and sucrose media, but direct germination was promoted, though not to more than 20·3%. The upper limit of sucrose conc. for zoospore release was 0·3–0·31 M; at 0·3 M some zoospores were markedly malformed. Some sporangia differentiated zoospores between 0·25 and 0·4 M, but could not emit them. Sporangial plasmolysis occurred at 0·32 M or above, but even when plasmolysed the sporangia could germinate directly.

Grewal (J. S.). **Effect of carbon nutrition on growth and sporulation of some anthracnose fungi.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 121–125, 1958.

The effect of 19 C compounds on growth and sporulation of *Gloeosporium musarum* from banana [cf. **36**, p. 417] and *G. papayae* and *Colletotrichum papayae* from papaw in Czapek's liquid medium was studied at the Dept of Botany, University of Allahabad. Arabinose, rhamnose, lactose, sucrose, glucose, galactose, and erytheritol supported good growth but it was significantly poorer with starch, inulin, and arbutin.

All monosaccharides, maltose, lactose, raffinose, and sorbitol supported good sporulation. It was poor on mannitol and glycerine and absent on dextrin and inulin. The presence and number of setae in *C. papayae* was affected by the nature of the C compound.

Gutter (Y.). **Effect of light on sporulation of Trichoderma viride Pers. ex Fries.**—*Bull. Res. Coun. Israel*, Sect. D, **5**, 4, pp. 273–286, 3 fig., 2 diag., 1957.

At the Agricultural Research Station, Rehovot, Israel, sporulation of 5 isolates of *T. viride* on potato dextrose agar was strongly stimulated by exposure to light [cf. **36**, p. 718] from 40 w. daylight fluorescent lamps, while continuous darkness caused failure of or marked delay in spore formation and changed the cultural characters. When the cultures were transferred from light to darkness, or vice versa, the effect on sporulation appeared to be retroactive, the diam. of the spore-bearing (or spore-free) central disk being smaller than that of the colony at the moment of transfer. Alternating conditions induced the formation of alternate concentric rings of sporulating and non-sporulating mycelium. With some isolates, the width of each consecutive ring increased, though the density of spores decreased.

A single exposure to light caused the formation of one ring of spores only. An exposure of 20–60 sec. to light of 85–90 lux was sufficient to induce sporulation. There was a reciprocal relationship between light intensity and period of exposure, a constant amount of light being required for sporulation [cf. below].

Light induced sporulation only during a definite stage in the development of the mycelium; there was no response by germinating spores at various stages, by old mycelium, or mycelium which had already started to sporulate.

Preliminary experiments indicated that oxygen is essential for spore formation.

Jerebzoff (S.). **Relation entre la quantité d'énergie lumineuse reçue par Monilia fructicola et la croissance de ses conidiophores fertiles.** [Relation between the quantity of light energy received by *Monilia fructicola* and the growth of its fertile conidiophores.]—*C. R. Acad. Sci., Paris*, **246**, 11, pp. 1728–1731, 1 graph, 1958.

Under the influence of different light intensities, photoperiods, and photocycles, the growth of the conidiophores of *Monilia* [*Sclerotinia*] *fructicola* depends on the amount of light energy received [cf. above]. A clear-cut increase was registered from 20 lux-min./hr. upwards. Conversion to the conidial phase is a function of the quantity of energy furnished by a photocycle of 1 hr. within the range of 20–200 lux-min./hr.

Muller (W. H.). **Influence of temperature on growth and sporulation of certain fungi.**—*Bot. Gaz.*, **117**, 4, pp. 336–343, 1956.

At the Dept of Biological Science, University of California, Goleta, opt. vegetative growth of *Aspergillus niger* (on Difco nutrient agar+2% sucrose) occurred at 30° C., and opt. spore production at 30–35°. At 35° the colonies were markedly wrinkled and the spores grey. When the spores were exposed to 40° for 12 days all were killed, but those incubated for 5 days germinated at 25°. With *Rhizopus nigricans* [*R. stolonifer*] opt. growth and sporulation occurred at 25°, while growth was poor at 30°: exposure to 35° [time unspecified] was lethal, but spores exposed to 32° for 5 days remained viable. *Penicillium italicum* also grew best at 25°, but spore production was more pronounced at 30°; pigmentation was less marked at higher temperatures without sucrose.

Plunkett (B. E.). **The effects of aeration and light on toadstools.**—*M.G.A. Bull., 1958*, 99, pp. 76–79, 1958.

At Birkbeck College, University of London, a studyof stalk and cap development in *Collybia velutipes* [**36**, p. 178] and *Polyporus brumalis* under controlled environmental conditions was undertaken in connexion with the malformations in certain diseases of mushrooms. Both species required light for normal cap development. With the former 1% CO_2 diminished the growth of the cap while 5% prevented it entirely and also retarded stalk growth, but had no effect on *P. brumalis*. Reduction of atmospheric O to 1% did not affect either fungus. Fast-moving, dry air inducing a water loss of 1 mg. water vapour/cm² of fungus/hr. completely arrested the development of the fruit bodies of *C. velutipes*, but saturated air had no such effect. With *P. brumalis*, however, cap development was restricted in slow-moving, moist air, probably owing to diminished movement of materials in the stem.

Weiss (U.), Flon (Helen), & Burger (W. C.). **The photodynamic pigment of some species of Elsinoë and Sphaceloma.**—*Arch. Biochem.*, **69**, pp. 311–319, 3 graphs, 1957.

At the New York Botanical Garden the red, fluorescent pigment produced by spp. of *Elsinoe* and *Sphaceloma* was shown to be related to the erythroaphins and to exhibit photodynamic action upon Gram+ bacteria.

Ciferri (O.). **Azione attivante della streptomicina sullo sviluppo di alcuni funghi patogeni per le piante.** [The activating effect of streptomycin on the development of certain fungi pathogenic to plants.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **14**, (1–3), pp. 213–218, 1 graph, 1957. [English summary.]

In a liquid synthetic medium of glucose and inorganic salts streptomycin at 0·01–4 mg./ml. stimulated the growth of 9 species of fungi of 7 genera (several of them plant pathogens). Stimulation also occurred when streptomycin was the sole N source and when the glucose content of the medium was reduced to $\frac{1}{10}$ of the original.

MacDonald (J. A.). **Some aspects of our knowledge of the fungus cell.**—*Trans. bot. Soc. Edinb.*, **37** (*1956–57*), 3, pp. 146–162, 1958. [4 pp. refs.]

The author reviews work on the chemical nature of the fungus wall, the structure and function of nuclei and mitochondria, and the physiology of parasitism and reproduction.

Mitrofanova (Mme N. S.). Влияние травосмесей на микробиологические процессы в орошаемой светлокаштановой почве. [The influence of grass mixtures on microbiological processes in irrigated light brown soil.]—Изв. Акад. Наук Казах. ССР [*Bull. Acad. Sci. Kazakh S.S.R.*], *1957*, 12, pp. 20–39, 1 fig., 1 graph, 1957. [Kazakh summary.]

The State Selection Station at Alma-Ata, U.S.S.R., investigated over 5 years the fertilization and moisture conserving value of different grasses and legumes on a clay soil in the valley Ala-Tau, Kazakh S.S.R. The greatest development of the microflora was under 2-year-old pastures. The fall in the 3rd year was considerable.

Miller (J. H.), Giddens (J. E.), & Forster (A. A.). **A survey of the fungi of forest and cultivated soils of Georgia.**—*Mycologia*, **49** (*1957*), 6, pp. 779–808, 30 fig., 1958. [69 refs.]

The results are presented of a survey of the soil-inhabiting fungi of Georgia from soil samples taken from many different environments and different depths, the emphasis being on kinds of fungi rather than on numbers. In all 165 species were isolated, 10 of which are described as new. All determinations were made from plates inoculated either directly or by Allen's soil dilution method, many media being used. Rose bengal-streptomycin agar yielded the greatest number of species.

Shetye (P. Y.). **Soil fungi from a lime bed.**—*Bull. bot. Soc., Univ. Saugar*, **8**, 1, pp. 7–10, 1956. [Received Jan. 1958.]

Soil fungi collected from depths of up to 6, 7–12, and 13–18 in. in a lime bed near the University of Saugar, India, included *Aspergillus sclerotiorum*, *A. ruber*, and *Absidia lichtheimii*, here recorded for the first time in India, while *Aspergillus candidus*, *A. sulphureus*, *A. tamarii*, *Penicillium lilacinum*, *Fusarium* sp., *Curvularia lunata*, and *Botrytis* sp. were also represented. The fungal count reached a peak of 108,000/g. soil at 7–12 in. The bed (pH 8·4)is an intertrappean deposit in basalt.

Darpoux (H.), Ponchet (J.), & Guntz (M.). **Problèmes de pathologie végétale intéressant des régions à sols granitiques.** [Interesting problems of plant pathology in areas with granitic soils.]—*Rev. Path. gén.*, *1957*, 688, pp. 843–853, 1957. [English and Spanish summaries.]

The seriousness of club root (*Plasmodiophora brassicae*) of crucifers, potato scab (*Streptomyces scabies*), and take-all (*Ophiobolus graminis*) of gramineae on certain granitic soils in Brittany is considered in relation to pH and to control methods.

Caldwell (R.). **Fate of spores of Trichoderma viride Pers. ex Fr. introduced into soil.**—*Nature, Lond.*, **181,** 4616, pp. 1144–1145, 2 fig., 1958.

At the University of Manchester a modification of Legge's glass-fibre technique

[**31**, p. 394] was used to show that *T. viride* survived as chlamydospores and conidia for up to 20 months in beech wood and garden soils in the greenhouse, the spores germinating at a low rate [cf. **33**, p. 627]. That this may result in the colonization of suitable substrates was indicated by the presence of (presumably) recently formed chlamydospores in plant débris attached to the glass-fibre.

Stover (R. H.) & Freiberg (S. R.). **Effect of carbon dioxide on multiplication of Fusarium in soil.**—*Nature, Lond.*, **181,** 4611, pp. 788–789, 1958.

At the Division of Tropical Research, United Fruit Company, La Lima, Honduras, increasing the CO_2 content of natural soil [cf. **33**, p. 49] by exposure to air enriched with CO_2 (2–25% for 16–42 hr.), frequently stimulated the multiplication of *Fusarium oxysporum* f. *cubense* as determined by a dilution plate method. Similarly, the forms *lycopersici*, *nicotianae*, and *cucumerinum* produced many more colonies in soil moistened with 1% glutamic acid and left for 42 hr. in air containing 4% CO_2 (5, 18·2, and 14·4 colonies, respectively, / ml. of 1/1000 soil dilution) than in air (0·8, 3·6, and 1·6): *F. roseum* and *F. solani* were stimulated in a few instances.

Up to 25% CO_2 in air for 48 hr. gave no evidence of inhibition of either survival or multiplication of the fungi studied.

When a spore suspension of *F.o.* f. *cubense* freshly isolated from banana was grown in a liquid medium with radioactive CO_2 the total quantity of C^{14} fixed in the mycelium increased with increasing CO_2 conc., though the dry wt. of the fungus differed little from one conc. to another. The percentage of total C^{14} fixed, however, decreased slightly with increasing conc.

Sauerbeck (D.). **Auswirkung einer Molybdändüngung auf den Molybdängehalt und die Zusammensetzung verschied. Kulturpflanzen.** [The effect of a molybdenum fertilizer on the molybdenum content and the composition of various cultivated plants.]—*Z. PflErnähr. Düng.*, **80 (125)**, 3, pp. 203–216, 1958. [50 refs.]

From this tabulated account of experiments at the Agrikulturchemisches Institut, University of Bonn, W. Germany, it appears that the bulk of the Na-molybdate applied at levels up to 4 kg./ha. for the prevention of Mo deficiency in cauliflowers [**36**, p. 564] is not absorbed but remains in the soil until taken up by successive crops, especially beans [*Phaseolus vulgaris*]. This undesirable consequence may be avoided by the use of smaller quantities of the fertilizer (less than 500 gm./ha. is generally sufficient) or better still by a more 'natural' method of liming, Mo deficiency being usually a consequence of lime shortage.

Kursanov (L. I.) (Editor). Определитель низших растений. Том 4. Грибы. [Index of lower plants. Vol. 4. Fungi.]—449 pp., 443 fig., State Publishers, Soviet Science, Moscow, 1956. Roubles 14. [Received Apr. 1958.]

This text-book contains annotated keys to the Heterobasidiomycetes, Dacryomycetales, Tremellales, Auriculariales, Ustilaginales, and Uredinales by L. I. Kursanov; Autobasidiomycetes, Exobasidiales, and Agaricales by M. K. Khokhryakov; Aphyllophorales by D. V. Sokolov; Gasteromycetales by N. A. Naumov; and Fungi Imperfecti by I. E. Brezhnev. Keys are provided to the orders, families, genera, and species. There is an experimental key for the identification of the commonest groups of fungi and myxomycetes. No bibliographical references are given.

Möller (F. H.). **Fungi of the Faeröes. Part II. Myxomycetes, Archimycetes, Phycomycetes, Ascomycetes and Fungi Imperfecti.**—286 pp., 1 col. pl., 161 fig., appendix to Part I, Copenhagen, Ejnar Munksgaard, 1958. [12 pp. refs.] Dan. Kr. 60.

This further list [cf. **28**, p. 488] of over 300 fungi, including 1 new genus and new

taxa, all collected in the Faeröes during 1938–57, is preceded by a general part comprising, *inter alia*, notes on the mycological investigation on the Islands since 1938, a host list, and accounts of the distribution of the groups of fungi in the Islands and neighbouring countries. Among the spp. of economic importance may be mentioned *Plasmodiophora brassicae* [map 101] and *Albugo candida* on a number of cruciferous crops, *Spongospora subterranea* (very devastating), *Synchytrium endobioticum* [map 1], and *Phytophthora infestans* [map 109] on potato, *Venturia inaequalis* [map 120] (only the conidial state) on *Sorbus intermedia*, *Nectria galligena* [map 38] on young apple trees, *Diplocarpon earliana* and *Mycosphaerella fragariae* [map 110] (both conidial only) on the Hautbois strawberry, *M. grossulariae* (conidial only: *Septoria ribis*) on red currant, *Claviceps purpurea* [map 10] on various grasses, *D. rosae* [map 266] (conidial only) on garden rose, *Lophodermium pinastri* on *Pinus mugo*, *L. juniperinum* on juniper, *Sclerotinia sclerotiorum* (probably widespread in the Faeröes, especially in potato fields from the previous year, the apothecia appear in June-July and the sclerotia later), *Septoria apii* on celery, *Cladosporium fulvum* [map 77] on glasshouse tomatoes, *Corticium solani* (black leg of cabbage), *Puccinia antirrhini* [map 40], and *Botrytis tulipae* [map 170] on tulips.

Chona (B. L.), Munjal (R. L.), & Kapoor (J. N.). **Notes on miscellaneous Indian fungi—V.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 148–156, 8 fig., 1958.

This contribution [cf. **36**, p. 665] describes an additional 19 spp. of Indian fungi, 8 of which are new.

Mycosphaerella pyrina comb. nov. (syn. *Sphaerella pyrina*) was found on pear at Saharanpur, Uttar Pradesh. The shining black perithecia of *Trematosphaeria jasmini* sp. nov. on a drying *Jasminum* plant near Simla were 100–180 (mostly 150–180) μ diam., the asci 70–125 × 10–15 (mostly 70–90 × 12–14) μ, and the ascospores 20–35 × 5–7 μ. *Massarina psidii* sp. nov. was found near Delhi on drying twigs of guava bearing scabby fruits. Whether it is the cause of that particular scab disease is not yet determined. The perithecia were 200–300 μ, the asci 70–105 × 14–17 μ, and the ascospores 14–20 × 4–6 μ.

Solheim (W. G.). **Mycoflora saximontanensis exsiccata. Centum VII.**

Solheim (W. G.) & Cummins (G. B.). **Centum VIII.**—*Publ. Univ. Wyoming*, **21**, 4, pp. 142–155; 5, pp. 156–167, 1957.

These papers comprise brief notes on the specimens numbered 601–800 in this collection. *Phleospora caraganae* (685) on *Caragana arborescens* in Wyoming appears to be a new fungus record for the U.S.A. *Cumminsiella mirabilissima* (714) on *Berberis repens* in Montana constitutes the first collection of the aecidial state to be recognized in N. America [**37**, p. 206].

Kari (L. E.) (Editor). **Fungi exsiccati fennici, Institutio botanica Universitatis turkuensis.** [Exsiccati of Finnish fungi, Botanical Institute of the University of Turku.]—*Ann. Univ. åbo* (*turku*), Ser. A, **2**, 23, pp. 1–195, 1 map, 1957. [Abs. in *Biol. Abstr.*, **32**, 3, p. 828, 1958.]

This collection of 500 specimens represents the Erysiphaceae, a few Fungi Imperfecti, the Ustilaginales, and the Uredinales. Fungus and host indexes are provided, and a map shows the localities where the collections were made.

Malençon (G.). **Prodrome d'une flore mycologique du Moyen Atlas. 4e contribution.** [Prodrome of a mycological flora of the Middle Atlas. 4th contribution.] — *Bull. Soc. mycol. Fr.*, **73** (*1957*), 4, pp. 289–330, 11 fig., 1958.

This contribution [cf. **36**, p. 730] covers Protobasidiomycetes, Autobasidiomycetes, Corticiaceae, and Hydnaceae, mostly on dead timber, and comprises 23 species.

Teterevnikova-Babayan (Mme D. N.). Результаты изучения ржавчинных грибов Армянской ССР. [Results of the studies of rust fungi in Armenian S.S.R.]—*Nauch. Trud. erevansk. Univ.*, **30**, pp. 183–198, 1950. [Armenian summary. Received May 1958.]

This survey, the first of a series on the fungi of the Armenian S.S.R., deals with the Uredinales and is based on an 8-year investigation with the assistance of the Academy of Science and Erevan University. So far 159 species on 25 host families have been recorded. A few only are mentioned by name.

Negru (A.). **Cîtevà adăugiri la flora uredinalelor din R.P.R.** [Some additions to the rust flora of the R[omanian] P[eoples] R[epublic].]—*Commun. Acad. Repub. Rom.*, **7**, 4, pp. 459–467, 4 fig., 1957. [16 refs. Russian and French summaries.]

Puccinia arenariae on *Dianthus barbatus* and *D. chinensis* [cf. **36**, p. 188] is one of the 4 spp. described here, all new records for Romania.

Lindquist (J. C.). **Diorchidiella, un nuevo género de Uredinales (Pucciniaceae-Ravenelieae).** [*Diorchidiella* a new genus of the Uredinales (Pucciniaceae-Ravenelieae.]—*Darwiniana, B. Aires*, **11**, 3, pp. 415–417, 1 fig., 1957.

As a result of studies at the Facultad de Agronomía e Instituto de Botánica Spegazzini, University of La Plata, Argentina, the author states that *Diorchidium bonplandii* on *Mimosa bonplandii*, formerly described by him as being distinct from *D. australe* on *M. rocae*, is in fact identical with it. Furthermore, the structure of the teleutospores in *D. australe* is sufficiently different from that in the type, *D. woodii*, to justify setting up a new genus, *Diorchidella*, based on *D. australis* comb. nov. The rust was also found on *M. tandilensis* in Argentina.

Dennis (R. W. G.) & Reid (D. A.). **Some marasmioid fungi allegedly parasitic on leaves and twigs in the tropics.**—*Kew Bull., 1957*, 2, pp. 287–292, 7 fig., 1957.

Of the 5 fungi described *Dasyscyphus heveae* (Massee) Dennis & Reid comb. nov. (syn. *Cyphella heveae*) and *Marasmius cyphella* Dennis & Reid sp. nov. are found on *Hevea* in Malaya; the former is non-parasitic on twigs and the latter, parasitic on leaves and branches, is apparently the fructification of the fungus causing thread-blight of rubber. *M. pulcher* [**3**, p. 4], associated with a thread-blight on tea, is redescribed.

Ciferri (R.) & Corte (A.). **Revisione di tre specie del genere Oidium.** [A revision of three species of the genus *Oidium*.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **14** (1–3), pp. 278–287, 1957. [English summary.]

In 1955 potato powdery mildew (conidial only, *Oidium* sp.) was found near Pavia, Italy.

A powdery mildew on cultivated *Stapelia variegata* agreed with *O. acrocladum*, but was tentatively transferred to *Ovulariopsis* as *O. acroclada* (Ferr.) Ciferri & Corte comb. nov. *Oidium monosporum* on *Robinia hispida* appears to be morphologically identical with *Ovulariopsis cynarae.*

Moreau (C.). **Rhizoctonia bataticola (Taubh.) Butl. Maladie à scélerotes.** [*Rhizoctonia bataticola* (Taubh.) Butl. Sclerotial disease.]—*Rev. Mycol. Paris*, **21**, *Suppl. colon.* 2, Fiche 15, 6 pp., 1 fig., 1956. [11 refs.]

The nomenclature and geographical distribution of *Macrophomina phaseoli*, the chief genera of plants attacked, the symptoms caused, the morphological and biological characters of the fungus, infection, transmission, and control are summarized.

Armstrong (J[oanne] K.) & Armstrong (G. M.). **A race of the Cotton-wilt Fusarium causing wilt of Yelredo Soybean and flue-cured Tobacco.**—*Plant Dis. Reptr*, **42**, 1, pp. 147–151, 1958.

A new race of *F. vasinfectum*, causing a wilt of Yelredo soybean and Gold Dollar flue-cured tobacco, was collected in 1944 on soybean at Hartsville, S. Carolina [**29**, p. 453], and in 1945 at Clemson in a small area of a field mainly infested with the common race 1. In inoculation tests some isolates of race 1 attacked a few plants of both soybean and tobacco, indicating that race 2 is a mutant of 1 with increased pathogenicity to these hosts; in other respects the host range was the same. There was a reduction or complete loss of pathogenicity to soybean and tobacco (though not to cotton) when some isolates of race 2 were kept in culture.

Rogerson (C. T.). **Verticillium wilt in Kansas.**—*Plant Dis. Reptr*, **41**, 12, pp. 1053–1054, 1957.

V. albo-atrum, previously reported in Kansas only on elm [**20**, p. 39] and peony [cf. **34**, p. 63], has now been found also on *Catalpa speciosa*, Molin elm (*Ulmus americana*), and (new host records) *Elaeagnus angustifolia* and turnip.

Jenkins (Anna E.) & Fosberg (F. R.). **Record of Citrus canker and Sweetpotato stem and foliage scab in Micronesia.**—*Plant Dis. Reptr*, **41**, 12, pp. 1055–1056, 1957.

A recent examination of some specimens collected in 1946 has shown that the chief citrus disease in the Mariana and Caroline Islands is canker (*Xanthomonas citri*) [map 11]. Three specimens of sweet potato stem and foliage scab (*Elsinoe batatas*) [**23**, p. 1], associated with stunting of the terminal growth, were found in the Caroline Islands collections.

Cummins (C. S.) & Harris (H.). **Studies on the cell-wall composition and taxonomy of Actinomycetales and related groups.**—*J. gen. Microbiol.*, **18**, 1, pp. 173–189, 1 pl., 1958.

At the London Hospital Medical College, the cell-walls of 51 strains of 6 genera of Actinomycetales and of 7 strains of fungi were analysed. Those of the actinomycetes were composed of sugars, amino sugars, and a few amino acids, the general pattern being identical with that of the Gram+ bacteria. It is concluded from these results that the actinomycetes should be included in the Eubacteriales.

Baldacci (E.), Gilardi (E.), & Amici (A[lba] M.). **Il ciclo di vita degli Attinomiceti osservato al microscopio elettronico.** [The life-cycle of the Actinomycetes observed with the electron microscope.]—*G. Microbiol.*, **1**, pp. 512–520, 10 pl., 1956. [English summary. Received 1958.]

Amici (A[lba] M.) & Balduzzi (P.). **Su alcuni attinomiceti isolati da terreni delle Grotte di Castellana.** [On some actinomycetes isolated from soil from the Grottoes of Castellana.]—*Ann. Microbiol. Enzimol.*, **7**, 1–4, pp. 23–29, 3 fig., 1956. [English and German summaries. Received 1958.]

Baldacci (E.), Balduzzi (P.), & Amici (A[lba] M.). **Observations on some Actinomyces isolated from soil samples from Israel, and their morphology under electronic microscopy.**—*Bull. Res. Coun. Israel*, Sect. D, **5**, 4, pp. 263–272, 10 fig., 1957.

In the 1st paper strains representing 8 series [cf. **37**, p. 401] were studied; in the 2nd 5 strains are described with electron microscopic spore characters; in the 3rd 8 are dealt with, all at the University of Milan.

Jensen (N. F.). **Marking plants with spray paints.**—*Agron. J.*, **50**, 2, p. 112, 1958.

From Cornell University the author recommends the use of pressure cans of

inexpensive quick-drying paint for marking by spraying plants in the field. The use of different colours has proved a valuable aid in labelling cereals where differentiation within a group is necessary. Thus in plant-breeding work individual plants exhibiting rust resistance or early maturity may be marked with distinctive colours, enabling rapid recognition at harvest.

Morton (H. E.). **Stainless-steel closures for replacement of cotton plugs in culture tubes.**—*Science*, **126**, 3285, p. 1248, 1 fig., 1957.

At the Dept of Microbiology, University of Pennsylvania, stainless steel cylindrical caps are used for closing culture tubes. Three equidistant indentations at the circumference of the closed end ensure that a narrow gap is left to permit air to enter. Three inward pointing springs at the open end serve to hold the cap firmly on the tube.

Knaysi (G.). **New technique of growing molds in slide culture under environmental conditions similar to those prevailing in the Petri dish.**—*J. Bact.*, **73**, 3, pp. 431–435, 15 fig., 1957.

In this method described from the Laboratory of Bacteriology, Cornell University, 4 paraffin-coated segments of capillary tubing, of length equal to the width of a glass slide, are placed symmetrically across it, so that the outer ones (ext. diam. 0·5–0·6 mm.) are 20–21 mm. apart and the inner (diam. 0·1 mm. less than the outer) 12 mm. apart, and fixed to the glass by flaming. A sterile cover slip (15×15 mm.) is then placed over the inner capillaries and melted medium introduced into the chamber thus formed. When this has set the slip plus inner capillaries are removed and the organism inoculated on to the exposed surface. A larger slip (22×22 mm.) is then placed over the outer capillaries and sealed with 'vaspar' (vaseline/paraffin mixture) applied with a brush. Ventilation is provided by introducing 2 or 4 capillary tubes through the 'vaspar' seal into the spaces between the medium and the outer capillaries.

Growth in and above the medium is very much like that seen in Petri dish culture, but the optical conditions are greatly superior. The formation of water droplets, usually resulting from the heating effect of the light source, may be prevented by filtering the light through water.

Lowy (B.). **A method for obtaining soil-free aquatic phycomycetes.**—*Mycologia*, **50**, 1, pp. 142–144, 2 fig., 1958.

At Louisiana State University, Baton Rouge, colonies of aquatic phycomycetes obtained from soil by placing hemp-seed halves in soil and water in Petri dishes were examined more easily when the seeds were impaled on glass points about 7 mm. high drawn up from the base of the dish.

Panzer (J. D.) & Beier (R. D.). **A simple field inoculation technique.**—*Plant Dis. Reptr*, **42**, 2, pp. 172–173, 1 fig., 1958.

This technique was used at Fort Detrick, Frederick, Maryland, to inoculate rice with spores of *Piricularia oryzae*. The inoculum, mixed with talc or perlite, was ejected into both ends of a rectangular, muslin tent, 6×3×2·5 ft., by a Jackson and Perkins (Newark, New York) midget hand duster, the number of turns of the handle regulating the amount of inoculum. Previous calibration was made with the tent over squared paper, the amount of diluent deposited/sq. ft. being weighed.

Bawden (F. C.). **Viruses and virus diseases.**—*Rep. E. Malling Res. Sta., 1957*, pp. 37–42, 1958.

This account of the properties and behaviour of plant viruses [cf. **36**, p. 168; **37**, p. 27] constituted the Amos Memorial Lecture, delivered at Wye College in Nov. 1957.

Symposium on latency and masking in viral and rickettsial infections. Pp. xi+202, Minneapolis, Minn., Burgess Publishing Company, 1958. $4.75.

These Proceedings of a Conference held at the University of Wisconsin Medical School in Sept. 1957 include a paper by F. C. Bawden on 'Gradations and transitions between pathogenicity and commensalism in infections with plant viruses' (pp. 80–87, 29 refs.) and conclude with a discussion on concepts and terminology of viral infection, when the following definitions were agreed upon: '"Inapparent infection" covers, at the host-parasite level, the whole field of infections which give no overt sign of their presence. "Subclinical" can be used as an alternative, particularly in human medicine. "Latent infections" are inapparent infections which are chronic and in which a certain virus-host equilibrium is established. The adjective "latent" is best reserved to qualify "infection": the term "latent virus" being avoided. "Occult virus" is used to describe the cases where virus particles cannot be detected and in which the actual state of the virus cannot as yet be ascertained. It is preferred to "masked", since this word has been used in a number of contradictory meanings.

'Whenever it has been shown that viruses of animals or higher plants go through cycles as described for bacteriophage the terms "provirus", "vegetative virus" and "infective virus" are appropriate for the corresponding stages. Infective virus is the fully formed virus particle.

'A "moderate virus" (corresponding in some measure to a temperate phage) is one growing in a cell while still permitting its continued survival and multiplication; a "cytocidal" one kills the cell; "submoderate" covers intermediate cases. (Some viruses may be moderate in one cell-system, cytocidal in another.)'

Köhler (E.). **Über die Beziehung zwischen Viruskonzentration von Impflösungen und Infektionshäufigkeit. IV. Ergänzende Befunde.** [On the relation between virus concentration of inoculum solutions and infection frequency. IV. Concluding findings.]—*Phytopath. Z.*, **31**, 3, pp. 300–304, 2 graphs, 1958.

In concluding studies [**36**, p. 750] *Solanum demissum* (strain S) was found to be a suitable test plant for the quantitative demonstration of tobacco mosaic virus in the concentration range 1:1,000–1:1,000,000. The dilution end point lay in the vicinity of 1:5,000,000 in the single lesion test using carborundum powder. By this test the infectivity curve of potato X virus was established with and without the use of carborundum powder, in accordance with the available experimental data of H. L. Paul [**34**, p. 171]. It is to be noted that when entering the findings in the probability graph the abrasive merely causes a parallel displacement. When preparing the infectivity dilution curve for inoculations with both viruses together [**36**, p. 557] the greater systematic deviations occurring at the higher concentrations are easily corrected for by taking a lower figure than 100% for the number representing the highest possible number of the mixed foci of infection.

Porter (C. A.) & Weinstein (L. H.). **Studies on 2-thiouracil and plant virus synthesis.**—Abs. in *Science*, **126**, 3285, p. 1234, 1957.

In this paper, delivered at the Autumn meeting of the National Academy of Sciences, New York, 18–20 Dec. 1957, a study at the Boyce Thompson Institute is reported. Though it has been demonstrated that thiouracil [**37**, p. 218] can be incorporated into tobacco mosaic virus particles and thus render them incapable of reduplication, particles contaminated in this way are not sufficiently numerous for this mechanism to account for the observed reduction in virus multiplication.

In tobacco plants infected by cucumber mosaic virus and grown in nutrient solutions with thiouracil there was a reduction in nucleic acid and protein synthesis,

with no apparent decrease in the production of free amino acids and amides. These findings were substantiated by time-course and $C^{14}O_2$ fixation studies. Thiouracil-S^{35} was found to be incorporated into ribonucleic acid and to be metabolized into a number of compounds as yet unidentified. It is suggested that thiouracil inhibits virus multiplication because of its incorporation into normal and virus nucleic acids and by its inhibition of protein synthesis because of this aberrant nucleic acid synthesis.

Kunkel (L. O.). **Acquired immunity from infection by strains of Aster-yellows virus in Aster leafhopper.**—Abs. in *Science*, **126**, 3285, p. 1233, 1957.

In this paper, delivered at the Autumn Meeting of the National Academy of Sciences, New York, Dec. 1957, a study at the Rockefeller Institute is reported, in which colonies of leafhoppers (*Macrosteles fascifrons*), fed for 2 weeks on plants infected by aster yellows virus and then transferred for a like period to plants infected by the Californian strain of the virus, transmitted the former only, while the reverse also was true. Thus the multiplication of one virus strain in the vector prevented the transmission of the closely related strain.

Costa (A. S.), De Silva (D. M.), & Duffus (J. E.). **Plant virus transmission by a leaf-miner fly.**—*Virology*, **5**, 1, pp. 145–149, 1958.

At the U.S. Agric. Research Station, Salinas, California, and the Instituto Agronomico, Campinas, Brazil, transmission experiments were conducted with the leaf-miner fly *Liriomyza langei* and a number of viruses. No transmission of beet mosaic virus from sugar beet and spinach to sugar beet, *Chenopodium album*, *C. amaranticolor*, or spinach was obtained. Tobacco mosaic virus was transmitted from *C. murale*, tobacco, tomato, and petunia to *C. murale* and petunia; transmissions were highest when the virus source was an infected petunia plant. Sowbane (*C. murale*) mosaic virus was transmitted from sowbane to sowbane, but not to *C. amaranticolor*. Tobacco etch virus from tobacco and tomato was not transmitted to either plant, cucumber mosaic virus from *Nicotiana glutinosa* was not transmitted to tobacco, and lettuce mosaic virus from lettuce was not transmitted to *C. murale*, *C. amaranticolor*, or lettuce.

The successful transmission of the tobacco mosaic and sowbane mosaic viruses would appear to be the first reported cases of virus transmission by an insect of this group. The results indicate that the relationship of the transmitted viruses and the vector is a mechanical one, the virus probably being carried as a contaminant on the ovipositor.

Van Hoof (H. A.). **On the mechanism of transmission of some plant viruses.**—*Verh. Akad. Wet. Amst.*, Ser. C, **60**, 3, pp. 314–317, 1 pl., 1957.

This is a preliminary account of experiments performed at the Instituut voor Plantenziektenkundig Onderzoek, Wageningen, Netherlands, a detailed discussion of which is to be published elsewhere.

In order to ascertain the point of penetration by *Myzus persicae* and *Aphis fabae*, the aphids were fed on fragments of epidermis torn from [unspecified] leaves. Under an oil-immersion objective the path of the stylets was easily traced. The salivary sheaths almost invariably followed the cell walls, and staining with cotton blue+ lactophenol clearly revealed them in the intercellular spaces of the spongy parenchyma. As penetration of the inner cell wall of the epidermis took at least 15 sec. and virus is acquired in 5–15 sec., the aphids presumably obtain virus from the outer cell wall or from the wall between 2 epidermal cells. *M. persicae* also transmitted turnip virus 1 [turnip mosaic virus] from infected *Nicotiana glutinosa* leaves the cells of which had been repeatedly plasmolysed.

Harrison (B. D.). **Relationship between Beet ringspot, Potato bouquet and Tomato black ring viruses.**—*J. gen. Microbiol.*, **18**, 2, pp. 450–460, 1958.

Serological and plant-protection experiments at the Scottish Horticultural Research Institute, Invergowrie, Dundee, demonstrated that beet ring spot [**37**, p. 194] and potato bouquet viruses, the latter obtained from Germany [**32**, p. 274], are strains of tomato black ring virus [**28**, p. 647]. Tomato black ring and potato bouquet viruses are more closely related to each other than either is to beet ring spot virus, the degree of relationship being represented by the series potato bouquet virus–tomato black ring virus (lettuce)–tomato black ring virus (tomato)–beet ring spot virus. No evidence was obtained of any strain relationship between these viruses and tobacco ring spot virus [cf. **36**, p. 356] or peach yellow bud mosaic virus [cf. **37**, p. 149].

Protection between serologically related virus strains was frequently not reciprocal, and when protection was incomplete the symptoms caused by the second virus were milder than those in plants infected by that virus alone. Although the results of the plant-protection and serological tests agreed broadly, the correlation was incomplete, suggesting that the tests measure different properties of the virus particles.

Tomato black ring virus appears to have evolved differently in different countries. Isolates of the beet ring spot virus type from different parts of Scotland were indistinguishable, and the differences between 2 English tomato black ring virus isolates were very slight. The German isolate (potato bouquet virus) was only just distinguishable from the English isolates, but was readily distinguishable from the Scottish ones; the English isolates were somewhat less distinct from the Scottish isolates than was potato bouquet virus. Thus, the greatest differences were between isolates from the most widely separated sources and the differences decreased as the sources were nearer.

Costa (A. S.) & Duffus (J. E.). **Occurrence of Malva yellow vein mosaic in California.**—*Plant Dis. Reptr*, **41**, 12, pp. 1006–1008, 2 fig., 1957.

A hitherto unrecorded but widespread virus disease in the Salinas Valley, California, causing a very striking leaf mosaic on *Malva* weeds, is described and named *Malva* yellow vein mosaic virus. The virus is transmitted by *Myzus persicae* and when inoculated mechanically to *Malva parviflora*, *M. rotundifolia*, *M. sylvestris*, and *Lavatera assurgentiflora*, induced similar symptoms in all. The disease may be the same as that in Germany and Russia [*Malva* virus 1: **36**, p. 450]. A green mosaic was also common on *M. parviflora* in the area where the yellow vein mosaic occurred.

Annual Report of the West African Cocoa Research Institute, 1956–57.—90 pp., 2 plans (1 col.), 1958. 5*s*.

Virus research and investigations on black pod (*Phytophthora palmivora*) at Tafo Station, Ghana, are dealt with on pp. 20–37 of this report [cf. **36**, p. 385]. W. T. Dale and A. Attafuah secured successful infection of *Bombax costatum* and *Hibiscus abelmoschus* with the New Juaben strain of cacao swollen shoot virus [**37**, p. 150 and below], but the latter was not infected by the Kpeve strain. Susceptibility of herbaceous and semi-herbaceous plants of Malvaceae and Tiliaceae is of little significance as they do not normally harbour mealy bugs (*Pseudococcus njalensis*), are relatively short lived, and if susceptible often quickly killed. The Bosimtwi strain was recovered from *Herrania balaensis* 36 months after infection, New Juaben from *Sterculia alata* after 25, Kpeve from *Bombax buonopozense* after 19, and Bosomuoso from *Theobroma angustifolia* after 11. Distribution of infection in baobab (*Adansonia digitata*) makes it now appear doubtful that swollen shoot reached Ghana from the north [**35**, p. 360], nor does infection of seed in broken pods

seem a feasible means of spread. Infection of baobab, though probably antedating that in cacao, may have come from some other host.

W. T. Dale again reports failure of *P. njalensis* to transmit the New Juaben virus after only 1 hr. or less feeding time [cf. loc. cit.], but source feeds of over 24 hr. did not seem to reduce infection. There was no evidence of transmission from infective insects to their progeny, but 1st-instar nymphs only 2–3 days old are efficient vectors and must play a major part in spreading the disease. *P. njalensis* and *Planococcus citri*, but not *Ferrisiana virgata*, can transmit virus isolates from baobab, a further link between such isolates and Kpeve or Alaparun (Nigeria) virus from cacao. *F. virgata* transmitted 2 Western Province cacao virus isolates (Aiyiposo and Amafic), and *Pseudococcus* sp. (near *gahani*) Bosomuoso from the same area. Virus was transmitted by *P. njalensis* from both green and fully ripe pods from infected trees.

A. Attafuah and W. T. Dale, who are classifying isolates, report that New Juaben is spreading into areas where other strains occur. The virulent New Juaben was transmitted, with subsequent virulent symptoms, by *P. njalensis* to 27-month-old plants infected by a mild strain since the bean stage.

Preliminary necrotic symptoms, hitherto unreported, were noted on young plants infected by the Asalu strain [see below] at Tafo and Ibadan. By 8 months after bean infection New Juaben had reduced the dry weight of Amelonado plants to 16% of that of the uninfected, and caused some deaths; the figures for other isolates ranged from 28 to 81. There was no evidence that virus infection reduced water content [cf. **29**, p. 253]. Kpeve causes excessive defoliation. The effect of isolates on young seedlings is apparently a reliable guide to that on mature trees [cf. **37**, p. 150]. Trees may survive infection by the mild Hampong isolate for over 12 yr. Some isolates, probably of common origin, may have changed by selective adaptation in different hosts, and this is being investigated.

W. T. Dale found that F_1 Iquitos type seedlings (T 17) were not markedly resistant to New Juaben [loc. cit.]. There is little evidence that resistance and tolerance are closely correlated. Highly tolerant plants contain very little available virus. The Kpeve strain seems to be less readily transmitted by *P. njalensis*.

In experiments by E. Margaret Holden all attempts at mechanical transmission of cacao viruses gave negative results. Thiouracil and 8-azaguanine (both at 50 mg./l.) [cf. **36**, p. 710] were ineffective as chemotherapeutants against cacao viruses.

A. L. Wharton reports confirmation of previous work on fungicidal control of black pod; where no fungicides were applied, weekly as opposed to monthly harvesting gave increases of 50% in wt. of good beans recovered/pod. Carbide-Bordeaux mixture, applied 24 times/year, weekly, fortnightly, or monthly according to seasonal disease incidence, was the most effective treatment, and combined with weekly harvesting reduced infection to 1·7%. A 20% aqueous solution of a vinyl-latex resin, applied by 'flit gun' to pods of different ages, 'stretched' to form a continuous film over the growing pods which was still intact 2 months later, and was non-phytotoxic. Such a film may protect pods from fungus penetration.

Of 401 'black pods' recorded during the year, when 3,869 pods were noted and classified, 179 were cherelles, 99 green pods over 13 cm. long, and 123 ripe pods. Isolates of *Phytophthora palmivora* from Ghana grew 17·9–22·7 mm./day on oatmeal agar, those from Nigeria only 1·8–2 mm.

Virus research at the Ibadan sub-station, Nigeria, is described by J. M. Thresh (pp. 71–88). Of the isolates collected from swollen shoot outbreaks, 10 appear sufficiently distinct to warrant further investigation. In recording symptoms it is necessary to make observations over several months (at least twice a week during flushing) as different isolates cause distinct sequences of symptoms, which may, however, appear similar at particular stages. One isolate from Asalu [see above],

for which the name 'cacao necrosis virus' is proposed, induces quite distinct, severe necrotic symptoms on young graft-infected plants, which later recover; it has not yet proved transmissible by insects. The other 9 isolates are all transmitted by mealybugs; some are immunologically distinct, and some do not give rise to swellings, though still referred to as strains of cacao swollen shoot virus; some are apparently complexes of strains. Cacao plants infected by one strain had a dry weight 45% that of healthy plants, when both were grown in a glass roofed insectary, and 59% in a shaded insectary. Swollen shoot virus was found to hamper regeneration of coppiced trees and to reduce chupon growth. Decline in yield is not marked and trees are not killed by the virus alone. Trees that have shown symptoms may later become symptomless; swellings are a more reliable indication of infection than leaf symptoms. In coppiced trees mineral deficiency symptoms may mask those of the virus.

The virus was found to be more extensively distributed in a form available to mealybugs in trees with symptoms than in those without, but some transmission occurs before symptoms are visible. Infected trees may vary considerably in their potency as sources of virus.

The cutting-out programme [**28**, p. 164 *et passim*] has been modified, treatments being less drastic for small outbreaks. With discrete outbreaks (1–10 infected trees) treatment is extended to only 5 yd. from the nearest infection, and those of 11–50 trees to 15 yd., larger outbreaks being treated as before (30 yd.), as it is round these that more latent and missed infections occur and to greater distances. Further reduction is now, however, proposed, to 10 yd. for medium outbreaks and 15 yd. for larger.

In coppicing experiments regeneration was poor where a previously broken canopy had allowed the establishment of a competing ground vegetation; legumes such as *Stylosanthes gracilis* and *Crotalaria retusa* have given promising results as cover crops. Coppicing during the dry season rather than the wet gave the best regeneration, time from coppicing to production of a chupon 2 in. or more being a useful index of the rate. Weather conditions during the month after coppicing proved all important.

Report of the Cocoa Conference held at Grosvenor House, London, 10th to 12th September, 1957.—xiv+326 pp., 13 pl., 4 fig., 8 diag., 50 graphs (6 col.), 17 maps (13 col.), London, The Cocoa, Chocolate and Confectionery Alliance, [1958].

In the session on disease and pest control (pp. 71–144 of this report) [cf. **35**, p. 429] L. P. Oechsli reviewed recent developments in Latin America [cf. **36**, p. 232; **37**, p. 343]. Witches' broom disease (*Marasmius perniciosus*) was controlled by reducing sporophore development to 13% of that without treatment with eradicant sprays of sodium pentachlorophenate and DNOC. A critical review was given of the various control methods now in operation for this disease and for *Ceratostomella* [*Ceratocystis*] *fimbriata* [**37**, p. 271], *Monilia roreri*, and *Phytophthora palmivora*, including the use of power sprays for high-volume spraying, more modern, tractor-drawn low-volume spraying machinery, and back-pack mist-blowers.

W. T. Lellis and O. P. Filho described experimental comparisons of fungicides against *P. palmivora* by the Bahia Cocoa Institute, Brazil. There was no significant difference 27 days after treatment between cupravit (with spreader sticker), wettable orthocide 50 (with and without spreader sticker), copper Sandoz, and Bordeaux mixture, but copper Sandoz showed the highest residual effect after 66 days.

R. Renaud dealt with the distribution of virus diseases of cacao in the Ivory Coast [French version given], where this problem differs from that in Ghana, the

amount of damage due to swollen shoot virus [**36**, p. 384; and above] being relatively small, known outbreaks being mostly confined to two large areas, one in the E. extending from the Bondoukou district to the coast, the other in the W. from Daloa to Sonbré. Different 'forms' of the virus are as yet unclassified and only provisionally distinguished by symptoms and locality. The same author [French version] gave results of observations on pod rots made without taking account of the causal agents. In the Abengourou area of the Ivory Coast Cu spraying only once or twice a year reduced rotten pods by some 50%. There was no continuous increase in pod rot with the rise in total number of pods/tree, but above a certain number, there was a decline. In the area, however, rainfall is near the min. for cacao. Though *P. palmivora*, more than 1 strain of which appears to be present, was associated with rotted pods in the Bingerville area, *Trachysphaera fructigena* [**36**, p. 384] often replaced it elsewhere, the predominance of either fungus sometimes depending on the season. *Botryodiplodia theobromae* was widespread, sometimes attacking maturing and undamaged pods. Infection at the pod bases was found to be less than in Ghana.

J. Grimaldi outlined the present position of research on black pod in the French Cameroons [French version], where some 30% of the pods are estimated to be attacked by *P. palmivora*. *Colletotrichum gloeosporioides* [*Glomerella cingulata*] on cherelles otherwise weakened is of little importance, as also is *B. theobromae*. *P. palmivora*, which was shown to persist in the soil, first appears on the pods in various stages in May, but no leaf infection or branch cankers have been observed. The disease reaches a max. with the wet season from end Oct.–early Nov., and of the total number of diseased pods observed over a 30-week period, 62% became infected during this time.

P. S. Hammond gave some notes on the progress of pest and disease control in Ghana. Monthly inspections for swollen shoot are made on some 124,098 farms, reinspection of treated outbreaks alone costing £750,000/annum. The total number of diseased trees removed up to June 1957 since the campaign started in 1946 was 63 million and involved grant payments of approx. £7,020,324. Only 26·5% of the treated areas have been replanted, but there are 960,000 acres of young cacao, a ratio of about 1:3 of young to bearing cacao. The Agricultural Department's staff for swollen shoot control consists of 101 survey officers, 3,848 field assistants, and 11,500 labourers. In the control of black pod yield increases of 50 and 30% were obtained on plots in the Eastern Region by the use of low-volume (motorized) and high-volume (hand) spraying, respectively, though in Ashanti results were less marked. Few farmers, however, have taken up chemical control. Over-shading is undoubtedly a major factor in this disease, and improved capsid control should now enable this to be reduced.

J. R. G. Hadland and D. H. Welch in a further brief report on the control of black pod disease in the Western Region of Nigeria were of the opinion that spraying contributed materially to the record crop. In a paper on pest control research at W.A.C.R.I., D. J. Taylor stated that 1% dieldrin aqueous emulsion applied to cacao trunks with a 'Motoblo' sprayer at 10 gal./acre (1 lb. toxicant) brought about considerable reduction in the ant population, which in turn led to a marked fall in the number of mealybug (*Pseudococcus njalensis*) vectors of swollen shoot.

R. M. Lister and J. M. Thresh gave an account of the history and control of cacao swollen shoot disease in Nigeria [see above], at present confined to the Western Region.

Report on the Department of Agriculture Grenada, for the year 1954.—26 pp., 1957.

In the report by the Plant Protection Officer, W. H. Hagley (pp. 22–25), it is stated that control of witches' broom disease (*Marasmius perniciosus*) [**33**, p. 411] during the year achieved an overall reduction of incidence of 13·6% for estates

and 10·8% for small holdings, with a definite decline of pod and cushion infection. There was a slight advance of the disease to new areas. The number of trees treated, other than by cultivators, totalled 45,675; of this number approx. 50% of the trees felled (388) carried either pod or cushion infection or both.

Esau (Katherine). **Anatomic effects of Barley yellow dwarf virus and maleic hydrazide on certain Gramineae.**—*Hilgardia*, **27**, 1, pp. 15–69, 28 fig. (1 col.), 1957. [49 refs.]

The results are presented of a detailed study at the University of California, Davis, of the primary and secondary anatomic changes induced in barley, wheat, oats, *Avena fatua*, 3 spp. of *Bromus*, *Hordeum hystrix*, and *Phalaris paradoxa* by the virus [cf. **36**, p. 578] compared with those caused by maleic hydrazide. Many are the same, including inhibition of leaf initiation and elongation, necrosis of the phloem, sometimes of the xylem and parenchyma, and of the mesophyll accompanied by a sugary exudate, apparently emerging through the stomata, which are often degenerated by maleic hydrazide.

The initial effects differs, however, in the growing parts of shoot and root. Virus injury is first apparent in young phloem, indicating a close relationship between virus and phloem, whereas maleic hydrazide initially inhibits meristematic activity, and induces degenerative changes only in the older phloem. Neither agent causes hyperplasia.

Lal (S. B.) & Sill (W. H.). **Stability of Wheat streak mosaic virus in desiccated tissue.**—*Plant Dis. Reptr*, **42**, 2, pp. 226–228, 1958.

At Kansas State College, Manhattan, some of the wheat leaf samples infected by wheat streak mosaic virus and stored at 1° C. over calcium chloride retained infectivity for 5 years [cf. **26**, p. 327]. Detailed results are tabulated.

McNeal (F. H.), Berg (M. A.), Afanasiev (M. M.), & Army (T. J.). **The influence of Barley stripe mosaic on yield and other plant characters of 8 spring Wheat varieties grown at 4 nitrogen levels.**—*Agron. J.*, **50**, 2, pp. 103–105, 1958.

At Montana Agricultural Experiment Station, Bozeman, the performance of healthy seed samples of 8 spring wheat vars. and those infected by barley stripe mosaic was compared in field plots given 0, 25, 50, or 100 lb. N/acre. The virus [cf. **36**, pp. 237, 238 and below] caused moderate to severe reductions in plant height, total culms, bundle wt., wt. per 1,000 kernels, test wt., and yield (average reduction 32·8%). Grain from the diseased plants had a higher protein content. N applications (ammonium nitrate) favoured symptom expression; the yield from healthy plants increased with rate of application over the whole range, but that of diseased gave no response of any consequence to those in excess of 25 lb./acre.

Army (T. J.) & McNeal (F. H.). **Effect of nitrogen fertilization on symptom development, nitrogen content, and nitrogen uptake of spring Wheat infected with Barley stripe mosaic.**—*Agron. J.*, **50**, 2, pp. 106–109, 1 graph, 1958.

In a further experiment [see above] healthy and infected wheat seed of the same 8 vars. was sown in similar field plots. Visual symptoms were increased by N fertilization but, except with the vars. Lee and Thatcher, there was little difference in degree of infection at the 4 different N levels.

The % N in the aerial parts was higher (by 9·5% decreasing to 4·8% with maturity) in plants from infected seed, but the applications did not affect the N content of diseased or healthy plants.

Total N uptake as measured by aerial parts was much greater in plants from the healthy plots, owing to their better growth. Application of N increased the total N absorbed by both healthy and infected plants, but the latter absorbed less and the difference between the 2 groups increased with the level of application.

Hore (H. L.) & Sims (H. J.). **Recommended Wheat varieties.**—*J. Dep. Agric. Victoria*, **56**, 3, pp. 137–142, 7 fig., 1958.

Included in the wheat varieties recommended for the Mallee district are Beacon, named late in 1957 for distribution to farmers in 1958, which is a sister line to Olympic and possesses good resistance to flag smut [*Urocystis tritici*: **34**, p. 776], and Insignia 49, closely resembling Insignia in appearance, which was developed in an attempt to combine the high yield of Insignia with the resistance to rust [*Puccinia graminis* and *P. triticina*: **36**, p. 179; **37**, p. 345] of Gabo; this was achieved almost completely.

Shen (T.-H.) & King (Y.-K.). **Spring Wheat production in Taiwan.**—*Agron. J.*, **50**, 2, pp. 92–94, 1958.

In Taiwan wheat is grown as a winter catch crop (Nov. to mid Feb.) on paddy land, only early varieties of spring habit being adapted to this rotation. There is little stripe rust (*Puccinia glumarum*), but orange leaf rust (*P. rubigo-vera tritici*) [*P. triticina*] and black stem rust (*P. graminis tritici*) occur every season and affect the yield.

Borlaug (N. E.). **The impact of agricultural research on Mexican Wheat production.**—*Trans. N.Y. Acad. Sci.*, Ser. II, **20**, 3, pp. 278–295, 4 fig., 2 graphs, 1 map, 1958.

Included in this up-to-date survey are references to the breeding programme for the development of wheat varieties resistant to *Puccinia graminis* [**34**, p. 218] and a graph showing the shift in race populations in Sonora and Sinoloa during 1951–56.

Vasudeva (R. S.), Lele (V. C.), & Rao (M. H.). **A new physiologic race of Puccinia graminis tritici (Pers.) Erikss. and Henn. in India.**—*Indian Phytopath.*, **10** (*1957*), 2, p. 158, 1958.

From the Indian Agricultural Research Institute, New Delhi, is reported a new physiologic race of *P. graminis* [**34**, p. 28] in the Punjab. It differs from race 21 in producing a 3–4 type of reaction on Einkern and resembles 17.

Vasudeva (R. S.), Lele (V. C.), & Misra (D. P.). **A new physiologic race of brown rust on Wheat in India.**—*Indian Phytopath.*, **10** (*1957*), 2, p. 157, 1958.

From the Indian Agricultural Research Institute, New Delhi, is reported a new physiologic race of *Puccinia triticina* [**35**, p. 280] in the Punjab. A number of local Agra stocks, normally susceptible to all races, are resistant. It closely resembles race 70.

Haskett (W. C.) & Johnston (C. O.). **Chemical control of stem and leaf rust of Wheat in Kansas.**—*Plant Dis. Reptr*, **42**, 1, pp. 5–14, 1958.

In plot tests at Manhattan, Kansas, in 1952–55, one or two spray applications of actidione, manzate, dithane Z-78, thylate, karathane, and calcium sulphamate reduced infection (natural in the 1st two years; from inoculated spreader rows in the 2nd two) by *Puccinia rubigo-vera tritici* [*P. triticina*: **36**, p. 754] and *P. graminis tritici* [**37**, p. 30], and in some instances prevented losses in yield and reduction in test weight. Calcium sulphamate, however, caused marked reduction in the quality and viability of the seed.

Johnston (C. O.) & Huffman (M. D.). **Evidence of local antagonism between two cereal rust fungi.**—*Phytopathology*, **48**, 2, pp. 69–70, 1 fig., 1958.

In experiments by the U.S. Dept Agric. and Kansas State College, Manhattan, 2nd-leaf seedlings of susceptible Cheyenne wheat were inoculated with *Puccinia recondita* [*P. triticina*] 2, 3, and 5 days after inoculation with *P. coronata*. After

10 days' incubation fewer and generally smaller pustules of *P. triticina* had developed than on plants inoculated with *P. triticina* only [cf. **36**, p. 340]. *P. coronata* caused heavy flecking, and with the 5-day interval before the second inoculation, considerable chlorosis and tip burn, but no uredia were formed. The pustules of *P. triticina* varied in size according to their proximity to the chlorotic areas due to *P. coronata*.

Futrell (M. D.). **Wheat stripe rust epiphytotic in Texas in 1957.**

Young (H. C.) & Browder (L. E.). **Occurrence of stripe rust in Oklahoma in 1957.**

Pady (S. M.), Johnston (C. O.), & Rogerson (C. T.). **Stripe rust of Wheat in Kansas in 1957.**—*Plant Dis. Reptr*, **41**, 12, pp. 955–961, 2 maps, 1957.

Stripe rust (*Puccinia glumarum*) [**36**, p. 639] developed on wheat in part of Texas in 1957 and spread north and west, becoming epiphytotic in the Great Plains region for the first time on record. Wheat in the Saltillo area of Mexico was later than usual and the disease was present in most fields, inoculum from this source and from the light infections over a large area of Texas, combined with unusual weather conditions (heavy rain and low temp.), probably accounting for the general outbreak.

In Oklahoma where the disease appears to have been recorded for the first time [map 97], the epidemic appeared to depend upon the conditions in Texas during the late winter months. In Kansas, too, infection had not been reported previously; collections were made in 17 counties and reports received from several others. It is assumed that the disease appeared between 12 and 19 May, when weather conditions were unusually favourable.

In notes from other States (pp. 962–963) J. M. Daly reports that the disease occurred in trace amounts throughout Nebraska; J. G. Hennen that collections were made on winter wheat at Martin and Brookings, S. Dakota; and J. R. Vaughn that there was no serious occurrence in Wyoming, except at Laramie, where an epidemic developed, and that several fungicides which gave excellent control of black stem rust [*P. graminis*: **37**, p. 225] were only slightly effective against stripe rust.

Kendrick (E. L.) & Holton (C. S.). **New physiological races of Tilletia caries in the Pacific Northwest.**—*Plant Dis. Reptr*, **42**, 1, pp. 15–17, 1958.

From over 500 collections of *T. caries* [**37**, pp. 153, 275], representing 3 crop years, only 2 new races, T-17 and T-18, were identified and only the latter represented a new pathogenic type. It has been possible to obtain resistance to all known races with any combination of the Martin, Turkey, and Ridit types of resistance, but T-18 is able to attack varieties possessing both the Turkey and Martin types, such as the commercially valuable Omar. T-17 is identical in host range with race L-8 of *T. foetida*.

Dewey (W. G.) & Tingey (D. C.). **A new grass host for dwarf bunt.**—*Plant Dis. Reptr*, **42**, 1, pp. 18–19, 1 fig., 1958.

Tilletia contraversa [**37**, p. 405] was found on goat grass (*Aegilops cylindrica*) growing near a field of infected wheat near Nephi, Utah. Spores on goat grass and wheat appeared morphologically similar.

Bedi (K. S.). **Further studies on the control of loose smut of Wheat in the Punjab.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 133–137, 1958.

Experiments at the Section of Plant Pathology, Government Agricultural College and Research Institute, Ludhiana, showed that after pre-soaking of seed wheat for 4 hr. in water, exposure to solar heat for 1 hr. only is enough to devitalize the

intraseminal mycelium of *Ustilago tritici* [*U. nuda*: **33**, p. 594]. The rest of the exposure is necessary only for drying. Even 5 min. in the sun at noon is quite effective in reducing loose smut infection appreciably. Soaking in water at room temp. and drying in shade reduced infection by about one-third during May and June 1953.

Pielka (J.). **Septoriozy Pszenicy.** [Septoriosis of Wheat.]—*Hodowla Rośl. Aklim. Nasien.*, **1**, 5–6, pp. 745–756, 13 fig., 1957. [Russian and English summaries.]

In 1956 near Krakow the winter wheat var. Visokolietevka was attacked by *Leptosphaeria* (*Septoria*) *nodorum* [cf. **32**, p. 246]; with heavy infection the total loss of grain amounted to 46%.

Nakagawa (M.). **Studies on the resistance of Wheat varieties to Gibberella saubinetti. IV. The relation of the susceptibility to ear-scab and the potassium chlorate ($KClO_3$) reaction and the amount of fructose contents. V. Relation of the susceptibility to ear-scab and the decolorization, velocity of methylene blue and the amounts of glucose on Wheat. VI. Relation of the susceptibility to ear-scab and phosphorus content. VII. Relations among the genetical factors, susceptible substances and corresponding enzymes as to ear-scab on the Wheat plant.**—*Bull. Div. Pl. Breed, Tokai-Kinki agric. Exp. Sta.* 4, pp. 49–53, 1 fig.; pp. 54–57, 1 graph; pp. 58–60; pp. 61–68, 1 diag., 1957. [Japanese. Abs. from English summaries.]

Papers IV, V, and VI of this series on *G. saubinetti* [*G. zeae*: cf. **36**, p. 461] have been noticed from another source [**36**, p. 182]. In VII it is concluded that vars. with the A factor and the associated high fructose content have more saccharase than the others; those with the B factor (and high glucose) have large amounts of maltase; and the C factor, associated with high P content, appears to be adenosine triphosphatase.

Kurata (H.) & Nishimura (J.). **Studies on the control of Corticium foot-rot of Wheat plants. I. Soil conditions and disease incidence.**—*Ann. phytopath. Soc. Japan*, **22**, 2, pp. 97–102, 1957. [Japanese. Abs. from English summary.]

The effects of soil types, manures, and fertilizers on the development of foot rot (*Corticium gramineum*) [**35**, p. 883] were studied by artificial inoculation during 2 seasons at the Hyogo Agricultural Experiment Station, Akashi. The results showed that the least injury occurred to wheat grown in sandy soil to which organic manure, fertilizers, and lime were added, compared with loam and clay soil. There were marked seasonal changes in the microbial populations with the different soil types and fertilizers. The severity of the disease generally increased with the number of fungi in the soil, while decreasing with an increase of bacteria.

Zagallo (A. C.) & Katznelson (H.). **Metabolic activity of bacterial isolates from Wheat rhizosphere and control soil.**—*J. Bact.*, **73**, 6, pp. 760–764, 5 graphs, 1957.

At the Bacteriology Division, Science Service, Canada Dept Agric., Ottawa, comparative studies of representative bacterial cultures from wheat rhizospheres and control soil indicated that in general those from the former source were more active in oxidizing glucose, alanine, acetate, and possibly succinate. This effect was particularly noticeable with bacteria having complex nutritional requirements [cf. **19**, pp. 421, 422; **35**, p. 426].

Golubchuk (M.). **Studies on the relation of molds and mold products to 'sick Wheat' and other types of damage in stored Wheat.**—*Diss. Abstr.*, **17**, 9, p. 1889, 1957.

At the University of Minnesota surface-disinfected samples of hard red spring

wheat and samples inoculated with [unspecified] moulds [**36**, p. 690] were stored at 24° and 38° C. and approx. 12% moisture for periods up to 1 year. In most samples the mould counts decreased during storage but fat acidity increased at both temperatures. There was a sharp increase in germ damage in the inoculated samples at 38°.

The percentage of reducing sugars increased as fat acidity increased up to four-fold and as viability dropped from 93 to 3%, but bore no simple relationship to the increase in germ damage. Total free amino-N values were similar, but in the samples at 38° those exhibiting the highest germ damage had low values. The glucosamine content of sound grain of high viability and low fat acidity ranged from 15–59 p.p.m., while that of infected grain was 384±9 p.p.m. A method for detecting deterioration by estimating the glucosamine content shows promise but will need simplifying.

A toxin complex secreted by *Aspergillus flavus* was found to include an acidic heteromeric peptide which caused germ damage, inhibited respiration, and lowered the viability of the grain.

Papavizas (G. C.) & Christensen (C. M.). **Grain storage studies. XXVI. Fungus invasion and deterioration of Wheats stored at low temperatures and moisture contents of 15 to 18 per cent.**—*Cereal Chem.*, **35**, 1, pp. 27–34, 1 fig., 1958.

At Minnesota Agricultural Experiment Station samples of white wheat seed from the low-rainfall region of eastern Oregon were inoculated with *Aspergillus amstelodami*, *A. repens*, *A. restrictus*, and *A. ruber* (*A. 'glaucus'* group), as well as with *A. candidus*, *A. flavus* [see above], and *A. ochraceus* [cf. **37**, p. 277]. Stored for 12 months at 15–15·5% moisture and 5–10° C. the viability of the samples was not impaired and the germs retained their pale colour. At 16–16·5% moisture extensive mould invasion occurred at both 5° and 10°, viability was reduced, and many germs became brown. After 19 months at 16–18% samples at −5° were free from moulds and were sound with high viability, but at 5° and 10° many were infected and the germs died, their brown tinge being typical of 'sick' wheat.

Spicher (G.). **Der mikrobiologische Zustand der deutschen Weizenernte 1956. Der mikrobiologische Zustand der deutschen Roggenernte 1956.** [The microbiological condition of the German Wheat crop 1956. The microbiological condition of the German Rye crop 1956.]—*Getreide u. Mehl*, **7**, 2, pp. 13–14; 3, pp. 23–24, 1957.

The average numbers of [unspecified] bacterial and fungal contaminants [see below] detected in 148 samples of wheat from 7 provinces of W. Germany on examination at the Bundesforschungsanstalt für Getreideverarbeitung, Detmold, were 8,418,000 and 39,400/g., respectively [cf. **36**, p. 488].

The 137 rye samples [cf. below] contained averages of 12,925,000 bacteria and 137,900 moulds/g.

Spicher (G.). **Einleitende Untersuchungen über die Zusammensetzung der Mikroflora des Getreides.** [Introductory studies on the composition of the microflora of cereals.]—*Zb. Bakt.*, Abt. 2, **111**, 6–7, pp. 238–248, 2 graphs, 1958.

In 82% of the wheat and 76% of the rye samples examined in 1956 [see above] the mould population consisted almost exclusively of *Alternaria* and/or *Fusarium* spp.

Abe (T.) & Kono (M.). **On the relation between the infection and the fertilization of cereal crops inoculated with a conidial suspension of ergot fungus, Claviceps purpurea (Fr.) Tul.**—*Sci. Rep. Fac. Agric. Saikyo Univ.* 9, pp. 34–40, 1 pl., 1957. [Japanese. Abs. from English summary.]

In comparative inoculation trials by spraying or injection it was found that while

rye was susceptible to *C. purpurea* [cf. **33**, p. 53], wheat and barley were somewhat resistant. When the tips of young spikelets of wheat and barley were excised, infection occurred more readily; plants inoculated after the ovaries were fertilized always formed ergots. When fertilization was prevented by covering the ear rye was very susceptible. If the anthers were removed from rye spikelets the ovaries were more susceptible before artificial pollination than after. The greater susceptibility of rye appears to be due to the broader angle [? of opening of the glumes] and longer flowering period, giving more opportunity for infection than in wheat or barley; self sterility in rye increases the likelihood of germinating spores invading the ovary in competition with pollen.

Takahashi (R.), Akaki (H.), & Inouye (T.). **Semi-sterility in some two-rowed varieties of Barley for malt and the Barley stripe mosaic virus as its possible cause.**—*Ber. Ohara Inst.*, **11**, 1, pp. 78–91, 2 pl. (1 col.), 1 graph, 1957.

Semi-sterility of malting barley in Hokkaido, first observed about 1930 and originally considered to be of genetic origin, may be due, at least in part, to a seed-borne virus, apparently a strain of barley stripe mosaic virus, not previously reported in Japan. Mosaic symptoms were observed on 60–80% of the seedlings of the M14 strain and the vars. Shunsei and Harbin grown from seed collected in 1956, and a high positive correlation was found between the percentage sterility of the parent plants and seedling infection. The virus was readily transmitted mechanically, but not by aphids or leafhoppers and was not soil-borne.

Bedi (K. S.). **Control of loose smut of Barley with solar heat in the Punjab plains.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 138–141, 1958.

Trials conducted at the Section of Plant Pathology, Government Agricultural College and Research Institute, Ludhiana, in 1952 and 1953 demonstrated not only the effectiveness of solar heat in eliminating loose smut of barley (*Ustilago nuda*) [cf. **29**, p. 555; **37**, p. 469], but also its harmlessness to viability if the seed is dried on cloth or tarpaulin. In 1955 26 varieties and hybrids were treated without deleterious effect. This treatment is to be adopted on a large scale in the Punjab.

Purdy (L. H.). **Results of seed treatment tests for smut control on naturally infested Oats and artificially inoculated Oats and Barley.**—*Plant Dis. Reptr*, **42**, 2, pp. 233–237, 1958.

The results of greenhouse and field trials to determine the effectiveness of 18 commercial fungicide seed treatments [cf. **37**, p. 29 *et passim*] in the Pacific Northwest, carried out by the U.S. Dept Agric. and the Washington Agricultural Experiment Station in 1954–57, are tabulated. Loose smut (*Ustilago avenae*) of oats var. Anthony and covered smut (*U. hordei*) of barley var. Trebi proved to be well controlled by a number of the standard Hg fungicides. The desirability of using natural infection rather than artificial (vacuum) for such tests was also made evident, because the latter causes such high infection that even the best materials are ineffective. Heptachlor+PMA (Penn, Salt, but not Stauffer) at 4 oz./bush. gave the best control taking both diseases together.

Bontea (V[era]) & Becerescu (D.). **Combateria tăciunelui Ovăzului.** [Control of covered smut of Oats.]—*Probl. agric.*, **9**, 2, pp. 95–98, 1957. [Abs. from *Referat. Zh. Biol.*, *1958*, 3, p. 203, 1958.]

In experiments during 1950–52 in Romania, in areas where oats were infected by covered smut [*Ustilago hordei*], dipping the seed in 0·14% formalin reduced infection from 7% (untreated) to nil and improved yield.

Rosen (H. R.) & Spencer (J. A.). **Avena abyssinica susceptible to Helminthosporium blight.**—*Plant Dis. Reptr*, **42**, 2, pp. 238–239, 1958.

In the course of using *A. abyssinica* at the University of Arkansas, Fayetteville, in a breeding programme for resistance to rust (*Puccinia coronata*) it was found to be susceptible to *H. victoriae*, lessening its value for breeding purposes. The susceptibility of this *A.* species lends support to the authors' suggestion [**35**, p. 442] that the pathogen would be better named *H. sativum* var. *victoriae*.

Pringle (R. B.) & Braun (A. C.). **Constitution of the toxin of Helminthosporium victoriae.**—*Nature, Lond.*, **181**, 4617, pp. 1205–1206, 1958.

Further work showed that the toxin isolated from *H. victoriae* at the Rockefeller Institute for Medical Research, New York [**36**, p. 757], is very unstable. Two materials which reacted with ninhydrin as the preparations lost their activity were separated, one an apparently undescribed compound (for which the name 'victoxinine' is proposed) with the empirical formula $C_{17}H_{29}NO$, the other probably a peptide. Victoxinine at $2{\cdot}5 \times 10^{-4}$M completely inhibited the root growth of both toxin-susceptible and resistant oats. It may be responsible for the toxicity of the complete toxin, specificity being a function of the peptide portion.

Hey (A.). **Gesteigerter Maisanbau Problem des Pflanzenschutzes?** [Increased Maize cultivation—a plant protection problem?]—*Dtsch. Landw.*, **9**, 3, pp. 108–111, 4 fig., 1958.

With the exceptionally rapid extension of maize cultivation in the German Democratic Republic during the last few years, which is expected to reach 250,000 ha. shortly, comes the risk of an increase in the diseases and pests. The disease situation in other parts of the world is surveyed and the chances of introduction of important pathogens are discussed.

The epiphytotic development of smut (*Ustilago maydis*) in central Europe, including E. Germany [**37**, p. 202] in 1957 is attributed to the favourable influence of the high temperatures prevailing in June–July, combined with gross negligence in respect of elementary measures of hygiene and protection.

Other diseases were of minor importance, including head smut (*Sorosporium reilianum*) [*Sphacelotheca reiliana*], but the established fact of its viability under local conditions indicates the urgent need for attention.

Voitovich (K. A.). Гебрициды, эффективные для борьбы с пузырчатой головней Кукурузы. [Herbicides, effective for the control of Maize smut.]—Земл. Животновод. Молд. [*Zemled. Zhivotnovod., Moldavia*], *1957*, 3, pp. 68–69, 1957. [Abs. from *Referat. Zh. Biol., 1958*, 4, p. 193, 1958.]

In further studies on the control of maize smut [*Ustilago maydis*: **36**, p. 758; cf. **37**, p. 280] in Moldavia, U.S.S.R., a combination of DNC with preparation No. 125 [**35**, p. 864], applied at 3% after sowing and before emergence, reduced infection to 0·27%.

Leont'eva (Mme Y. A.) & Gerasimov (B. S.). Сроки протравливания семян Кукурузы смесью гранозана с гексахлораном и меркураном. [Timing of treatment of Maize grain with mixture of granosan with hexachlorane and mercuran].—Изв. Куйбыш. с.-х. ин-та. [*Izv. Kuybysh. s.-kh. Inst.*] 12, pp. 73–79, 1957. [Abs. from *Referat. Zh. Biol., 1958*, 4, p. 193, 1958.]

In the Kuybyshev region of the U.S.S.R. in 1955 treatment of maize grain with mercuran or a mixture of granosan and hexachlorane immediately before sowing reduced root rot [*Diplodia maydis*: **35**, p. 602] to $\frac{1}{2}$–$\frac{1}{6}$ and bacteriosis [*Bacillus mesentericus vulgatus*: **37**, p. 280] to $\frac{1}{3}$ and increased yield up to 60–85%.

Teter (N. C.) & Roane (C. W.). **Molds impose limitations in grain drying.**—*Agric. Engng, St. Joseph, Mich.*, **39**, 1, pp. 24–27, 2 graphs, 1958.

Climatic conditions in S.E. U.S.A. appear to favour mould development on maize during drying. At the Tidewater Research Station, Holland, Virginia, where investigations on this problem were carried out during 1954–5, 99% of the moulds implicated were identified by Christensen's methods [**25**, p. 517] as *Aspergillus flavus*, *Fusarium moniliforme* [*Gibberella fujikuroi*], *Penicillium* spp., and *Oospora* sp. In shelled maize moulds dictate a time limitation for lowering the moisture content to a relatively safe level of 15·5%. A time-temp. limitation curve for this purpose is presented. Using this curve and other data obtainable by simple calculations, the heat balance equation $0{\cdot}24\ QDT = WH$ may be solved for Q, where Q = lb. dry air/min./bush., D = average temp. depression through the bin in °F., T = allowable min. to dry to 15·5% moisture, W = lb. water to be removed to reduce 1 bush. to 15·5%, H = latent heat of vaporization, B.T.U./lb. water, and 0·24 = specific heat of air at constant pressure, B.T.U./lb. In this manner a series of curves was derived which would give the ventilation requirements for several conditions.

Foy (C. D.) & Barber (S. A.). **Magnesium deficiency and Corn yield on two acid Indiana soils.**—*Proc. Amer. Soc. Soil Sci.*, **22**, 2, pp. 145–148, 1 fig., 1958.

Field experiments were conducted on acid, sandy loams at Newton (pH 4·7) and Tracy (4·8), N. Indiana, in 1953–4, to determine the influence of Mg, calcitic lime, and K_2O on yields, Mg deficiency symptoms (leaf striping), and leaf composition, using the maize var. Nichols N-4 at Newton and De Kalb 406 (a commercial hybrid) at Tracy. Treatments included factorial combinations of 100 and 500 lb. K_2O, 72 lb. $MgSO_4.7\ H_2O$, and 6 tons of calcitic bag lime/acre.

At Newton both rates of K induced extensive Mg deficiency symptoms, confirmed by the low Mg and high K_2O leaf contents, but yields were not reduced. Addition of Mg prevented the development of deficiency symptoms, significantly increased Mg content, and diminished K_2O, but yields were again unaffected. On the other hand, calcitic lime raised production significantly without materially influencing K-induced Mg deficiency symptoms or Mg percentage in the leaves.

At Tracy only a few plants were affected by Mg deficiency and none of the treatments affected yields. It is concluded from these results that yield-limiting Mg deficiency in maize is unlikely to arise from the application of K_2O and calcitic lime fertilizers in the amounts at present recommended under local conditions.

Annual Report of the West African Rice Research Station, 1956.—38 pp., 1 pl., 1 diag., 1958. 2*s*.

Damage by *Piricularia oryzae* [**37**, p. 83] was severe at the Station (Rokupr, Sierra Leone) in only 2 small nurseries of var. Sughandi; in the others attacks were unimportant. A slight outbreak of *Ephelis pallida* occurred on var. Lead for the first time.

Chattopadhyay (S. B.) & Chakrabarti (N. K.). **Relationship between anatomical characters of leaf and resistance to infection of Helminthosporium oryzae in Paddy.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 130–132, 1958.

At the State Agricultural Research Institute, West Bengal, data were taken of the thickness of the cuticle and epidermis, number of silicated epidermal long cells and epidermal bulliform cells, and SiO_2 content of 5 rice varieties showing different degrees of infection by *H. oryzae* [*Cochliobolus miyabeanus*]. Asra 108/1 and Badsabhog 72, with a comparatively thinner epidermal layer, contracted more leaf infection than Patnai 23, Bhasamanik, and Tilakkatchery, with a thicker layer.

Silicated epidermal bulliform cells were less in Asra 108/a and Badsabhog 72, which were more susceptible [**34**, p. 104]. No correlation was observed between SiO_2 content and resistance.

Fang (C.-T.), Ren (H.-C.), Chen (T.-Y.), Chu (Y.-K.), Faan (H.-C.), & Wu (S.-C.). **A comparison of the Rice bacterial leaf blight organism with the bacterial leaf streak organisms of Rice and Leersia hexandra Swartz.**—*Acta phytopath. sinica*, **3**, 2, pp. 99–124, 3 pl., 1957. [Chinese. Abs. from English summary.]

Comparison of symptoms on and cultures from rice in Kwantung, China, have shown that bacterial leaf streak, in which water soaked streaks appear, expanding and becoming yellowish brown with copious bacterial exudate, is quite distinct from bacterial leaf blight (*Xanthomonas oryzae*) [**37**, p. 162 and below] and is caused by a new species, *X. oryzicola* Fang *et al.*, the cultural behaviour of which is described. This pathogen proved weakly pathogenic to *L. hexandra* but not to *Zizania latifolia*.

Cultures from *L. hexandra*, weakly pathogenic to rice but not causing leaf blight or streak when sprayed on to mature plants, are considered to represent another new species, *X. leersiae* Fang *et al.* which is also fully described. Water soaked streaks on the leaves, with bacterial exudate, were produced on *L. hexandra*, but the bacterium was not pathogenic to *Z. latifolia*. Several isolates from *L. hexandra* in S. China proved pathogenic to rice, though this was not so in Nanking. Experiments also failed to indicate that *Leersia* spp. were natural hosts of *X. oryzae*.

Fang (C.-T.), Liu (C.-F.), & Chu (C. L.). **The inhibition of glucose to the growth of Xanthomonas oryzae.**—*Acta phytopath. sinica*, **3**, 2, pp. 125–136, 1 pl., 1957. [Chinese. Abs. from English summary.]

At Nanking Agricultural College it was observed that in media with $NH_4H_2PO_4$ as N source glucose was used by *X. oryzae* [see above] from rice as a source of C, but addition of 1–2% glucose to potato medium, or 3 or 4% to nutrient broth, markedly inhibited growth owing to the reducing effect of glucose, which could be counteracted by oxidizing agents. Growth was better at pH 5·5–6·5 than at pH 7. Other *X.* spp. and several saprophytic bacteria isolated from rice were not inhibited on potato agar by glucose, a possible distinguishing characteristic for *X. oryzae*.

Baba (I.), Takahashi (Y.), & Inada (K.). **Studies on the nutrition of the Rice plant with reference to the occurrence of the so-called 'akagare' disease. V. Changes in the respiratory rate and activities of some enzymes as affected by the occurrence of the disease.**—*Proc. Crop Sci. Soc. Japan*, **26**, 3, pp. 190–192, 2 graphs, 1958. [Japanese. Abs. from English summary.]

In further studies [**37**, p. 163] an increase (in comparison with healthy plants) in the respiratory rate and peroxidase and catalase activities, accompanied by a decrease in cytochrome c oxidase and ascorbic acid oxidase, occurred in the leaves of potted rice plants with symptoms of akagare disease growing in field soil without additional K.

Kul'pinova (Mme M. P.). Крупнопузырчатая головня Сорго. [Long smut of Sorghum.]—Защ. Раст., Москва [*Plant Prot., Moscow*], *1957*, 4, pp. 38–39, 1 fig., 1957.

Studies on long smut (*Tolyposporium ehrenbergii*) of sorghum in the middle Asian regions of the U.S.S.R. in 1950–53 showed that the vars. Biver Milo 1647, Kubanskoe krasnoe 1677, Durro jeltoe 555, and Gaslyankorichnevii 272 are susceptible and broom sorghum [*S. bicolor* var. *technicum*] is more resistant.

The opt. temp. for growth of the fungus *in vitro* was 25–30° C. The best time for

sowing is when the soil temp. does not exceed 12°. The disease, which is not well known in these regions, has apparently spread rapidly in the last 5–6 years.

Fedoseeva (Mme Z. N.). Нове в біології **Sphacelotheca panici miliacei (Pers.) Bub.** [New data in the biology of *Sphacelotheca panici miliacei* (Pers.) Bub.]—Укр. Бот. Журн. [*J. Bot. Acad. Sci. Ukr.*], **14**, 4, pp. 65–70, 5 fig., 1957. [Russian and English summaries. Received May 1958.]

At the Biological Institute, Kharkov University, *S. panici miliacei* [*S. destruens*] from millet [*Panicum miliaceum*] passed through a complete cycle of development in culture. On Czapek's medium chlamydospores appeared 1 week after colony formation, on potato glucose after 2 weeks, on wort agar after 1 month, and on Flerov's medium after 6–8 months. In culture they measured 7·5–12·5 (av. 10·3) μ and germinated 6–7 days after formation; those in the field were 10–17·5 (12·2) μ.

Carpenter (J. B.). **Further studies on tristeza in Meyer Lemon in Arizona.**—*Plant Dis. Reptr*, **41**, 12, pp. 1014–1015, 1957.

In a further study on the spread of citrus tristeza virus [cf. **36**, p. 316] 29 trees of several stock-scion combinations growing in groups adjacent to 9 infected Meyer lemons were indexed by budding to Mexican lime; none gave positive results. It was established by bud inoculation that sweet orange, shaddock, lemon, and Marsh grapefruit on Ponderosa lemon stocks and Washington navel and tangerine oranges on rough lemon are all susceptible to infection by the virus present in Meyer.

Nour-Eldin (F.) & Childs (J. F. L.). **Sweet Orange bark pitting, an unreliable symptom of tristeza infection.**—*Plant Dis. Reptr*, **41**, 12, pp. 1011–1013, 2 fig., 1957.

Failure to transmit citrus tristeza virus by budding to West Indian and baladi lime indicated that the bark pitting observed on some sweet orange trees on sour orange or sweet lime rootstocks in Egypt is not a reliable symptom of infection by the virus [cf. **36**, p. 317].

Knorr (L. C.). **Reappraising Citrus rootstocks, with particular reference to their susceptibility to virus diseases. I. Trifoliate Orange (Poncirus trifoliata (L.) Raf.).**—*Citrus Mag.*, **19**, 8, pp. 12, 14–15, 18, 22–23, 1957. [Abs. in *Biol. Abstr.*, **32**, 3, p. 878, 1958.]

In recent years some 40,000 citrus trees have been budded to trifoliate orange (*P. trifoliata*) annually in Florida. This practice is not without danger, as the rootstock is susceptible to citrus exocortis virus [cf. **33**, p. 421; **37**, p. 283] which is present in many symptomless budwood source trees.

Wallace (J. M.). **Virus-strain interference in relation to symptoms of psorosis disease of Citrus.**—*Hilgardia*, **27**, 8, pp. 223–246, 14 fig., 1957.

Illustrated descriptions are given of the symptom types of psorosis virus (psorosis 'A', psorosis 'B', concave gum, blind pocket, crinkly leaf, and infectious variegation [**19**, p. 85; **23**, p. 61]). Transmission experiments at the Citrus Experiment Station, Riverside, California, confirmed Fawcett and Cochran's observation (*Phytopathology*, **32**, p. 22, 1942) that sweet orange seedlings develop bark symptoms within 5 months when inoculated with bark from a lesion on a tree infected by psorosis A, whereas they do not when 'healthy' (non-lesion) bark taken 3–5 in. away is used. Young-leaf symptoms appear soon after both types of inoculation, but while seedlings grafted with non-lesion bark may develop the localized bark lesions associated with psorosis A after a period of 5 years or more, those grafted with lesion bark develop early bark symptoms that spread in a few months and cover the entire seedling, accompanied by dieback, and subsequently persistent

spots, blotches, and rings on their mature leaves, symptoms associated with psorosis B. Once these 2 symptom types are established transfers to healthy seedlings generally reproduce them, though mildly affected trees may develop bark lesions after some years, and grafts from these lesions will give rise to severe symptoms. On the other hand, trees with severe symptoms may have occasional limbs with mild symptoms, which are reproduced by grafting.

Cross-protection was demonstrated when sweet orange seedlings infected from non-lesion bark of psorosis A showed no early bark effects when re-grafted with lesion bark. Similar protection against lesion bark inoculum occurred in seedlings first inoculated with concave gum, blind pocket, crinkly leaf, or infectious variegation, a confirmation of their relationship, while by contrast the unrelated tristeza virus gave no protection. Cross-protection inhibited the appearance of severe symptoms on reinoculated sweet orange trees, but did not prevent the development some 2 yr. later of localized bark lesions, such as occur naturally. These lesions developed slowly, but always near the site of reinoculation, and were obviously initiated by it, a difference from natural lesions, which are scattered over the tree when infected. Lemon does not normally develop bark lesions when infected. When lemon on sweet orange rootstock was inoculated with lesion bark, the scion reacted with young-leaf symptoms only but the rootstock developed early bark symptoms; orange seedlings inoculated from the lemon scion produced no early bark symptoms. Furthermore, transfers to sweet orange from lemon grafted with lesion bark produced no early bark lesions, but they did develop when the lemon had been inoculated from a sweet orange seedling with the severe early bark reaction. A lemon seedling infected from non-lesion bark was reinoculated with lesion bark from sweet orange: 4 years later bark near the reinoculation site grafted to sweet orange produced early bark lesions and mature leaf symptoms, though bark from some distance above did not.

These results indicate that psorosis B is not, in fact, a distinct virus strain, but that there are 2 components in psorosis A, *a* and *b*, both systemic and able to cause young-leaf symptoms; only *b*, normally held in check by *a*, is responsible for lesions. In some circumstances *b* may be able to enter some cells in advance of *a* and multiply sufficiently to become locally dominant. From such a focus, adjacent cells could be invaded by *b* sufficiently to upset the balance there also. Such a mechanism would explain, *inter alia*, the slowly growing, localized lesions on orange after years of systemic infection made evident only by young-leaf symptoms. It would also explain the localized lesions developing after a time at graft sites of lesion bark. So far, however, attempts to separate the two components have failed. In lemon, apparently, the two remain in equilibrium.

Carpenter (J. B.) & Hield (H. Z.). **Accentuation of blue albedo in Marsh Grapefruit by sizing sprays with 2,4,5-T.**—*Plant Dis. Reptr*, **42**, 1, pp. 63–64, 1958.

In experiments at Riverside, California, spray applications of 2,4,5-T to Marsh grapefruit increased the percentage of abnormal fruits with symptoms of stubborn disease [**26**, p. 12] and the associated blue albedo. The relationship of blue albedo to the disease and the effect of 2,4,5-T is uncertain.

Berry (S. Z.). **Effects of an ethylene dichloride and trichlorethane mixture on three Citrus fruit pathogens.**—*Plant Dis. Reptr*, **42**, 1, pp. 102–106, 2 fig., 1 graph, 1958.

At the Agricultural Marketing Service, Orlando, Florida, a mixture of ethylene dichloride and trichlorethane gas (Sound Delivery Vapor, Brogdex Co., Orlando) inhibited spore germination of *Diplodia natalensis*, *Phomopsis* [*Diaporthe*] *citri*, and *Penicillium digitatum* [**37**, p. 165] exposed *in vitro* for 6–30 hr., but the effect was rapidly lost on aeration. A 16-hr. exposure of oranges to the gas was only slightly

more effective in controlling fruit decay than one of 6 hr. There was a rapid decrease in protection 1 week after treatment.

Christova (Eleonora). Неколко болести по внасяните у нас Лимони, Портокали, Мандарини и Банани. [Some diseases on imported Lemons, Oranges, Mandarins, and Bananas.]—Бюл. Раст. Защ. (*Bull. Plant Prot., Sofia*), **6**, 3 (11), pp. 50–58, 4 fig., 1957.

The following fungi found recently on imports by the Bulgarian Institute of Plant Protection are described: *Pleospora herbarum* and *Fusarium* sp. on mandarins only, *Colletotrichum gloeosporioides* [*Glomerella cingulata*] and *Alternaria citri* on oranges also, *Penicillium digitatum* and *P. italicum* on all three citrus fruits, *Gliocladium roseum* on oranges, *Botrytis cinerea*, *Aspergillus niger*, and *Rhizoctonia* [*Corticium*] *solani* on lemons, and *Gloeosporium musarum* on bananas.

Horn (N. L.), Sinclair (J. B.), & Brown (R. T.). **The occurrence of oospora rot of Citrus in Louisiana.**—*Plant Dis. Reptr*, **42**, 2, pp. 264–265, 1 fig., 1958.

An *Oospora* sp., agreeing with the description of *O. citri-aurantii* [*Geotrichum candidum* var. *citri-aurantii*: **35**, p. 294; map 124] in its morphological characters on orange but differing on potato dextrose agar (conidia 3·3–3·9×3·3–14·9 μ) and in the type of soft rot produced, is recorded for the first time in Louisiana, on navel and Satsuma orange and kumquat.

Venkatakrishniah (N. S.). **Canker disease of sour Lime and its control.**—*Lal-Baugh* (*J. Mysore hort. Soc.*), **2**, 2–3, pp. 40–44, 4 fig., 1957.

In preliminary experiments in 1955–6 by the Agricultural Department, Bangalore, lime trees 3–4 years-old, severely affected by *Xanthomonas citri* [cf. **36**, p. 310], were sprayed (after removal of infected twigs) with agrimycin-100 at 20–30 g./10 gal. water, fungi copper Geigy (1 lb./20 gal.), and ultra sulphur (a colloidal sulphur in powder form; $1\frac{1}{2}$ lb./25 gal.). All the plants were sprayed 3–6 times at intervals of 15–30 days. Ultra sulphur greatly reduced the incidence of infection and effectively controlled spread; incidence was much less on trees sprayed with agrimycin 100 (20–30 gal./100 plants) [per application] than on those treated with fungi copper. The untreated were heavily infected.

Fisher (Francenia E.). **Maneb-oil injury to Grapefruit.**—*Plant Dis. Reptr*, **42**, 2, pp. 266–267, 2 fig., 1958.

From the Citrus Experiment Station, Lake Alfred, Florida, it is recommended that maneb should not be used against citrus greasy spot [**36**, p. 759; **37**, p. 84] as it is more expensive and less effective than sprays containing zineb, Cu, or oil emulsion, and combined with oil it is liable to damage grapefruit severely and Valencia orange to some extent.

Cooper (W. C.). **Comparison of several iron-chelating agents in correcting iron chlorosis in Dancy Tangerines in the Rio Grande Valley.**—*J.R. Grande Vall. hort. Soc.*, **11**, pp. 11–13, 1957. [Abs. in *Chem. Abstr.*, **52**, 4, col. 3241 c, 1958.]

At Weslaco, Texas, soil applications of 5 or 1 g./tree of an aromatic amine, Chel 138 H Fe, and an unidentified Fe chelate, RA 157 Fe [see below], were highly effective in the correction of iron chlorosis of 3-yr.-old Dancy tangerine trees on Cleopatra mandarin rootstocks [cf. **35**, p. 448 *et passim*].

Hilgeman (R. H.). **Response of Orange trees growing in the Salt River Valley of Arizona to chelated iron compounds.**—*J.R. Grande Vall. hort. Soc.*, **11**, pp. 14–20, 1957. [Abs. in *Chem. Abstr.*, **52**, 4, col. 3241 d–e, 1958.]

Rapid and quasi-complete re-greening of iron-chlorotic orange trees followed soil

applications of Chel 138 H Fe at 12 or 24 g./tree [see above and below], while RA 157 Fe and sequestrene 330 Fe (diethylenetiramine penta-acetic acid) [cf. **37**, p. 408] gave satisfactory though less outstanding results. Chel 138 H Fe was about equally beneficial with trees growing on both sour and sweet orange rootstocks on 4 soil types. Control was best accomplished by uniform application of the materials during May in a basin covering the entire area and irrigating into the soil.

ARMSTRONG (W. W.). **Comparison of several materials in correcting chlorosis of Trifoliate Orange and Rangpur Lime seedlings in California.**—*J.R. Grande Vall. hort. Soc.*, **11**, pp. 21–27, 1958. [Abs. in *Chem. Abstr.*, **52**, 4, col. 3241 f-g., 1958.]

Sequestene 330 Fe, though toxic to *Poncirus trifoliata* at 2–4g./sq. ft. soil, may be as effective in the control of iron chlorosis [see above] at 0·5 g. as $FeSO_4$. Sequestrene NaFe caused no damage to orange trees in experiments during 1954 but was highly toxic in 1956. Chel 138 H Fe was only moderately effective and caused toxic symptoms. The best of the correctives tested was RA 157 Fe, which was also non-phytotoxic.

The reactions of Rangpur lime were too variable to permit of any definite conclusions regarding the several treatments.

LAKSHMINARAYANAN (K.). **The physiology of host-parasite relationship in the Fusarium wilt of Cotton. II. Pectin methyl esterase formation by Fusarium vasinfectum Atk. III. Distribution and derangement of free amino acids.**—*Proc. Indian Acad. Sci.*, Sect. B, **47**, 2, pp. 78–86; 3, pp. 115–123, 1958.

In the 1st of these papers [cf. **36**, p. 404] from the University Botany Laboratory, Madras, it is reported that methyl esterase [cf. **35**, p. 51] was best obtained from a crude acetone enzyme extract of *F. vasinfectum* by extraction with 10% saline. The opt. pH for the enzyme was 6–6·2, the opt. temp. 33° C., and there was an opt. conc. of the substrate, apple pectin.

The 2nd reports a study in which the distribution of 23 free amino acids in the roots, shoots, and leaves was examined chromatographically in 6- and 12-day-old plants of (susceptible) Kulunganni 2 (K2) and (resistant) Cambodia and Madras Uganda cotton infected by *F. vasinfectum* and in healthy controls.

In the control series cystine was consistently present in all organs of the resistant vars. but completely absent from K2, suggesting a relationship with the mechanism of wilt resistance. In the inoculated series cystine made its appearance in the K2 plants (roots and shoots only) at 6 days, but was altogether absent from both these and the resistant vars. at 12 days.

It is suggested that its appeance in K2 may represent a systemic immunological response: its subsequent breakdown could be assumed to have occurred in the process of resisting the pathogen or may be due to toxic metabolites resulting from the host/parasite interaction.

SINCLAIR (J. B.). **Laboratory and greenhouse screening of various fungicides for control of Rhizoctonia damping-off of Cotton seedlings.**—*Plant Dis. Reptr*, **41**, 12, pp. 1045–1050, 1957.

At Baton Rouge, Louisiana, of 17 fungicides screened in the greenhouse against *R.* [*Corticium*] *solani* causing damping-off of cotton seedlings [**37**, p. 43], the most promising were omadine derivatives, PCNB, captan, and nabam. Wettable powders were applied at 5 lb./acre to inoculated soil at sowing time and liquids at 4 qt. The best combination treatments were captan plus PCNB or the Zn salt of omadine, nabam plus zinc sulfate or mylone, and mylone plus PCNB.

Aslanov (D. B.). К вопросу о развитии корневой гнили Хлопчатника в Туркмении. [Concerning the development of root rot of Cotton in Turkmen.]—Тр. Ин-та земледелия АН Туркм. ССР [*Trud. Inst. Zemled. Acad. Sci. Turkm. S.S.R.*] **1**, pp. 89–99, 1957. [Abs. from *Referat Zh. Biol., 1958*, 1, p. 194, 1958.]

In Turkmen S.S.R., in 1953–55, there was a wide distribution of root rot on cotton and vegetables. The causal agents proved to be *Rhizoctonia* [*Moniliopsis*] *aderholdii* [**37**, p. 285] and *R.* [*Corticium*] *solani* [loc. cit.]. Temperature (15–20° C., min. 2°, max. 41·3°) is conducive to the development of the fungi. Artificial inoculation induced very severe infection on cotton, lucerne, tobacco, beet, jute, and other crops. The cotton vars. 108 F. and C450–555 are fairly resistant to root rot and 2 I 3 is very susceptible.

Frederiksen (R. A.) & Christensen (J. J.). **Aster yellows destructive to Flax in the Upper Mississippi valley in 1957.**—*Plant Dis. Reptr*, **41**, 12, p. 994, 2 fig., 1957.

Aster yellows virus became prevalent and destructive on flax [**36**, p. 177] in Minnesota for the first time in 1957, infection varying from a trace to 30%. The outbreak was attributed to the prevalence of the vector, *Macrosteles fascifrons*. Partially infected plants of 30 different varieties averaged 31 bolls, each with 5 seeds, compared with 52 bolls of 8 seeds each for the healthy ones. Out of more than 900 varieties and lines tested for resistance a few were free from infection.

Atkins (I. M.), Futrell (M. C.), & Merkle (O. G.). **Observations on curly top of Flax in Texas.**—*Plant Dis. Reptr*, **41**, 12, pp. 995–1000, 3 fig., 1957.

[Beet] curly top virus was present in experimental flax plots [**35**, p. 451] at College Station, Texas, during the past 3 seasons and reduced yields in some commercial fields in 1957. It is transmitted by the beet leafhopper [*Circulifer tenellus*] which has migrated into central Texas [**35**, p. 139]. No variety tested was immune or even highly resistant but some selections appeared tolerant. Early sowing increases damage. The availability of alternative food sources in the surrounding flora may be an important factor affecting the severity of the disease.

Anselme (C.). **Sur le blanc du Lin.** [On powdery mildew of Flax.]—*Tech. Bull. Inst. nat. Rech. agron., Versailles* 6, pp. 59–62, 1 fig., 1957. [English translation.]

In July, 1949, after a long drought, flax growing in the experimental fields of the Centre National de la Recherche Agronomique, Versailles, became affected by powdery mildew (*Oidium lini*) [cf. **20**, p. 466]. The oidia measured $30 \pm 6 \times 13 \pm 2\,\mu$, which is very close to the figures for *Erysiphe cichoracearum* given by Allison [**13**, p. 515]. No perithecia were found. The outbreaks occurred chiefly on oil vars., fibre flax often not being attacked until harvest. On the Maroc variety the mycelium covered both surfaces of the leaves.

Kristensen (H. R.). **Nellike-viroser.** [Carnation viroses.]—*Tidsskr. Planteavl*, **61**, 4, pp. 718–736, 6 fig., 1957. [English summary.]

The 1st part of this paper deals with the occurrence and distribution of foreign carnation viroses and the 2nd with recent studies on ring spot in Denmark, where infection has been observed in 35 varieties, including a number of Sim vars. In numerous sap inoculation experiments *Dianthus barbatus* proved to be the best indicator plant [cf. **37**, p. 286]. The virus has been transmitted to *Gomphrena globosa*, *Tetragonia expansa*, White Burley tobacco, *Nicotiana glutinosa*, cowpea, bean (*Phaseolus vulgaris*), *Chenopodium album*, and *Zinnia elegans*, all of which reacted with local lesions, accompanied by systemic symptoms in a few plants of *G. globosa* and in most of *D. barbatus*.

The ring spot virus was not completely inactivated by dilution of the expressed, clarified sap of *D. barbatus* to 1:10,000 or by 10 min. heating to 85° C. or 14 days' ageing at room temp. The serological titre in sap of *D. barbatus* was 1:16 and that of the antiserum used in the tests 1:160.

The most practical method of control is stringent selection of mother plants, though heat therapy may also be of value in special cases.

HELLMERS (E.). **Four wilt diseases of perpetual-flowering Carnations in Denmark.** —*Dansk bot. Ark.*, **18**, 2, pp. 1–200, 39 fig., 1958. [79 refs. Danish summary, pp. 188–200.]

A full account is presented of studies conducted mainly at the Royal Veterinary and Agricultural College, Copenhagen, Denmark, in 1953–56. Sections on bacterial stem-crack (*Pseudomonas caryophylli*) [**36**, p. 589] and bacterial stunt (*Pectobacterium parthenii* var. *dianthicola* var. nov., similar to Lelliott's strain of *E. chrysanthemi*) [**36**, p. 31] cover the description of each disease, isolation of the pathogen, infection tests, description of the causal organism, dissemination, and control, a 3rd section dealing with incidence and other carnation wilt diseases in Denmark. Wilts caused by parasitic fungi, i.e. fan mould (*Phialophora* [*Verticillium*] *cinerescens*) [cf. below] and collar fusariosis (*Fusarium dianthi* [loc. cit.], *F. culmorum* [cf. **30**, p. 568], and other *F.* spp.) are described in an appendix. A final chapter differentiates the 4 forms of wilt, with a key.

Bacterial stunt causes shortening of the internodes of the top shoots, whereas plants affected by bacterial stem-crack have shoots of normal length, deeply cracked stems, and a sticky vascular tissue. The bacterioses are distinguished from the mycoses by the presence of irregular blotches with a water-soaked margin in the vascular tissue.

V. cinerescens causes a vascular stain in the stem 20–40 cm. above soil-level, appearing as a sharply defined, brown ring inside the bark. In collar fusariosis there is an extensive, irregular, brownish-grey, fibrous, dry rot in the bottom 5–20 cm. of the stem.

MOREAU (MIREILLE). **Tissu ligneux du collet et susceptibilité de l'Œillet cultivé aux parasites vasculaires.** [The ligneous tissue of the collar and susceptibility of the cultivated Carnation to vascular parasites.]—*Bull. Soc. bot. Fr.*, **104**, 5–6, pp. 257–259, 4 fig., 1957.

In carnations the degree of lignification is modified by cultural conditions (outdoor or indoor) and soil differences, and varies also between varieties. Four types of distribution of woody tissues are distinguished: in type I, where the tissues are in continuous concentric rings surrounded by sclerified cells, an effective mechanical barrier is presented to heavy attack by *Phialophora* [*Verticillium*] *cinerescens* [**37**, p. 86]; in type IV lignification is reduced and the woody tissues are in islands running radially. According to growers, the Versailles group is the least fragile; Anita is resistant to fusariosis [*Fusarium oxysporum* and *F. roseum*: loc. cit.; **36**, p. 762], but susceptible to verticilliosis, to which Sole Nice and Chaperon Rouge are more resistant than Rose France, and Arc-en-ciel is even more susceptible than Soir de Paris.

Carnation disease discovered in Pennsylvania.—*Flor. Exch.*, **129**, 6, p. 11, 1957. [Abs. in *Biol. Abstr.*, **32**, 3, p. 876, 1958.]

Carnations throughout southern Pennsylvania are affected by 'greasy blotch', caused by *Zygophiala jamaicensis* [cf. **25**, p. 221].

BRIERLEY (P.). **Tomato aspermy virus in Chrysanthemums from Asia and Europe.** —*Plant Dis. Reptr*, **42**, 1, pp. 61–62, 1958.

At Beltsville, Maryland, tomato aspermy virus [**37**, p. 218] was detected by sap

inoculation to tobacco in 27 of 153 varieties of chrysanthemum imported from Japan and in 5 of 15 from Taiwan. Aspermy virus and chrysanthemum stunt virus appear to be spreading in Japan. It is likely that the former is of eastern Asiatic origin because the chrysanthemum is also, and most east Asian varieties seem adapted to the virus.

Reiter (Liselotte) & Weber (F.). **Sind die 'Cytoplasmakugeln' von Delphinium X-Körper ?** [Are the cytoplasmic globules of *Delphinium* X-bodies?]—*Protoplasma*, **49**, 2, pp. 259–261, 2 fig., 1958.

A re-examination was made at the Institut für Anatomie und Physiologie der Pflanzen, University of Graz, Austria, of inclusions in the epidermal cells of the perianth leaves of *Delphinium* designated 'cytoplasma globules' by Scharinger (*Protoplasma*, **25**, 1936). *D. californicum* was the only one of 7 species affected locally. Since the globules showed chromatic fluorescence with coriphosphine [cf. **37**, p. 80], it is inferred that they are of virus origin.

Bozarth (R. F.) & Corbett (M. K.). **Tomato ringspot virus associated with stunt or stub head disease of Gladiolus in Florida.**—*Plant Dis. Reptr*, **42**, 2, pp. 217–221, 1 fig., 1958.

At the Agricultural Experiment Station, Gainesville, Florida, tomato ring spot virus was obtained from gladiolus plants with abnormally short flower spikes ('stub head') and of somewhat stunted growth, constituting a first record of the occurrence of the virus on this crop in the State. It has previously been isolated from gladiolus in Oregon (G. F. Snow, Thesis Oregon State College, 1956). The identity of the virus was established by means of differential hosts and immunological studies, and comparison with tobacco ring spot virus, but attempts to infect gladiolus either mechanically or by *Myzus persicae* were unsuccessful.

Roistacher (C. N.), Baker (K. F.), & Bald (J. G.). **Hot-water treatment of Gladiolus cormels for the eradication of Fusarium oxysporum f. gladioli.**—*Hilgardia*, **26**, 17, pp. 659–684, 2 fig., 7 graphs, 1957. [31 refs.]

This detailed study from the Agricultural Experiment Station, Los Angeles, covers the thermal relations of the cormels of 6 varieties and the thermal death points of *F.o.* f. *gladioli* and *Stromatinia* [*Sclerotinia*] *gladioli* [cf. **36**, p. 811 *et passim*]. Dormant cormels treated in hot water for 30 min. were killed between 135 and 140° F. Inactivation of *F.o.* f. *gladioli* within the cormel occurred between 128 and 135° and *S. gladioli* sclerotia in basal leaf tissue were killed by 128° for 30 min. Cormels, being far more tolerant of heat, should be treated in preference to corms, and they should be dormant [see below]. Presoaking of cormels overnight is desirable, and without it the *Fusarium* may survive; the addition of 5% alcohol to the hot water also increased the effectiveness of the treatment. While cracking the outer husk of the cormels before or immediately after treatment reduced the number of survivors at the higher temps., removal of the husk 73 days later increased germination.

Roistacher (C. N.), Bald (J. G.), & Baker (K. F.). **2,3,5-triphenyltetrazolium chloride as an indicator of germinability and dormancy of Gladiolus cormels.**—*Hilgardia*, **26**, 17, pp. 685–704, 1 col. fig., 8 graphs, 1957. [60 refs.]

The technique of using tetrazolium to classify stages of dormancy of gladiolus cormels [cf. **34**, p. 788 and above] is described in detail and its value assessed. The cut surfaces of longitudinally split cormels are placed for 4 hr. at 70° F. in the dark on filter paper soaked in a 1% sol. of the reagent; various shades of pink develop according to the degree of dormancy.

Brierley (P.). **Virus-free Hydrangeas from tip cuttings of heat-treated ringspot-affected stock plants.**—*Plant Dis. Reptr*, **41**, 12, p. 1005, 1957.

At Beltsville, Maryland, tip cuttings of Charm hydrangea plants infected by hydrangea ring spot virus [**37**, p. 44] were taken at intervals and kept at 35° C.; when established they were indexed repeatedly by sap inoculation to *Gomphrena globosa*. None of the cuttings was free from the virus after 4 weeks' heat treatment of the parent plant, 6 of 9 were healthy after 12 weeks, 6 of 9 after 15, and 6 of 11 after 19. There is no evidence that the virus is inactivated throughout the plant by heating but it seems feasible to reclaim virus-free material of the current commercial varieties by this method. In forcing trials there was no difference in the performance of healthy and ring spot-infected plants of the relatively new vars. Reve Rose, Rose Supreme, Sainte Claire, Sainte Therese, and Todi.

Corbett (M. K.). **A virus disease of Lupins caused by Bean yellow mosaic virus.**—*Phytopathology*, **48**, 2, pp. 86–91, 1958. [27 refs.]

These observations from Gainesville, Florida, concern the chief virus disease of blue, yellow, and white lupins (*Lupinus angustifolius*, *L. luteus*, and *L. albus*) [cf. **36**, p. 809], grown for seed and forage in the S.E. United States. The symptoms on blue lupins resemble those attributed to pea mosaic virus in Australia and New Zealand [**23**, p. 301; **37**, p. 417]. Those on yellow lupins, resembling Mastenbroek's *Lupinus* virus 1 in Holland (*Tijdschr. PlZiekt.*, **49**, pp. 172–178, 1943), are initial vein clearing and light mottle, later more intense, followed by leaf malformation and proliferation of axillary buds. Seed formation is abortive. White lupins, seldom grown, develop severe mottle and leaf malformation.

All 25 spp. of lupin inoculated proved susceptible except 6 perennials, but attempts to cross these with the commercial lines have so far been unsuccessful. The isolate usually obtained from lupin (L VI) withstood ageing in vitro for 72 hr. but not 84, was non-persistent in *Myzus persicae* and *Aphis medicaginis*, and was related immunologically to strains of bean yellow mosaic virus. It was transmitted through 6·2% of the seed of field-grown diseased yellow lupins. German grown seed of the yellow var. Weiko III [loc. cit.], however, proved virus-free.

Since a serological relationship between pea mosaic virus and bean yellow mosaic virus has been demonstrated in Australia [**36**, p. 305], the virus disease of lupins in Australasia may be attributable to a strain of bean yellow mosaic virus. Descriptions of lupin virus diseases in S. Africa [**33**, p. 232] suggest that some are due to bean yellow mosaic virus and others to cucumber mosaic virus, strains of these two apparently causing the chief virus diseases of lupins in the world.

The main field sources of infection in N. Florida are sweet clovers (*Melilotus alba* and *M. indica*). The virus is spread by aphids more readily among white and yellow lupins than blue.

Forbes (I.), Wells (H. D.), & Edwardson (J. R.). **Resistance to the gray leaf-spot disease in blue Lupines.**—*Plant Dis. Reptr*, **41**, 12, pp. 1037–1038, 1 fig., 1957.

At Tifton, Georgia, and Gainesville, Florida, a technique for the inoculation of blue lupin (*Lupinus angustifolius*) with *Stemphylium solani* [**36**, p. 325] appeared satisfactory for use in breeding forage varieties. Potted 14-day-old plants were sprayed with a culture suspension then subjected to intermittent mist for 2 days before being returned to the greenhouse. Gainesville S13 was the most vigorous and productive of the resistant strains tested.

Kochman (J.). **Badania nad plamistością łodyg Łubinu powodowaną przez Phomopsis leptostromiformis (Kühn) Bubak.** [Studies on the patchiness of Lupin

stems caused by *Phomopsis leptostromiformis* (Kühn) Bubak.]—*Acta agrobot.*, **6**, pp. 117–143, 2 pl., 10 fig., 1 graph, 1957. [English summary (1½ pp.).]

A disease of lupins caused by *P. leptostromiformis* (*Cryptosporium leptostromiforme*) [cf. **6**, p. 732] was found by the author in Poland in 1952. Plants were attacked at all stages, and young ones were killed when the stem below the cotyledons was affected. On stems of older plants there were expanding, deep, yellow-brown patches with near black stromatic masses. The pathogen is parasitic in summer and saprophytic in spring. In the two states it differs in the size of stromata and pycnidia. The spring pycnidiospores are the source of primary infection, which is worst on dry sandy soil in hot weather. With 30% soil humidity attacked plants died, whereas at 75% they survived and later developed normally.

In plants artificially infected by spraying with a spore suspension infection increased with the subsequent period of maintenance under a bell jar (6–36 hr.). The opt. temp. for spore germination is 25° C. *P. leptostromiformis* was easily isolated and cultivated on malt agar. Only the yellow lupin was attacked and high vitality of the plants was the most important factor in resistance. The fungus developed saprophytically on blue and white lupin in autumn and survived on woody pieces of lupin stem for at least 3 yr.

Murakishi (H. H.). **Host range, symptomatology, physical properties, and cross-protection studies of Orchid virus isolates. Serological and morphological relationships among Orchid viruses.**—*Phytopathology*, **48**, 3, pp. 132–137, 1 fig.; pp. 137–140, 1 fig., 1 graph, 1958.

The results are described from the University of Hawaii, Honolulu, of the effects produced on 8 genera of orchids and on *Datura stramonium* by abrasive inoculation with Cattleya necrosis virus (CNV) [**35**, p. 17], Cymbidium mosaic virus (CMV) [loc. cit.; cf. **35**, p. 370], Cattleya colour-break virus (CBV) [cf. **36**, p. 323], Dendrobium mosaic virus (HMV) [**33**, p. 605], Spathoglottis diamond spot virus (SDV) [loc. cit.], and Vanda mosaic virus (VMV) [loc. cit.]. Inoculation of 23 genera outside Orchidaceae produced no symptoms, but re-inoculation to *Spathoglottis plicata* from cucumber, nasturtium, zinnia, passion fruit, and rice induced symptoms.

The similarity of the symptoms produced on most of the hosts and cross protection studies indicated CMV to be present in all the isolates, CNV and SDV isolates to be strains of [orchid] (Cymbidium) mosaic virus and the other 3 apparently to be mixtures of CMV and another virus.

In the second paper serological studies, together with electronmicroscope studies at the University of California, Berkeley, are described which showed HMV also to be a strain of CMV, whereas in the CBV isolate, CMV was associated with [orchid] (Odontoglossum) ring spot virus, previously known only in California [**32**, p. 129], and in the VMV isolate with a new virus having rods 80×13 mμ, for which no selective host could be found.

Bertini (S.). **Intorno ad alcuni agenti di seccume nei cladodi di 'Ruscus hipoglossum' L.** [On certain agents causing withering of the cladodes of *Ruscus hypoglossum* L.]—*Agricoltura ital.*, **56** (N.S. **11**), pp. 61–73, 7 fig., 8 graphs, 1957. [French summary.]

Among fungi associated with a withering of the cladodes of the ornamental plant *Ruscus hypoglossum* in Italy the writer isolated *Leptosphaeria rusci* (pycnidial state *Diplodia rusci*) and *Phyllosticta ruscigena*, the cultural, morphological, and some physiological features of which are described.

Lloyd (P. J.) & Crossan (D. F.). **Anthracnose of Pansy and Violet caused by Colletotrichum violae-tricoloris.**—*Plant Dis. Reptr*, **42**, 1, pp. 86–90, 1958.

At Delaware Agricultural Experiment Station pansies and violets inoculated in the

greenhouse with *V. violae-tricoloris* developed circular or zonate lesions on the leaves, and elongate, tan to dark brown spots on the sepals, petals, stems, and petioles. Acervuli were formed on the host and in culture, with hyaline conidia averaging 20·6 by 3·8 μ. Penetration usually occurs at the juncture of epidermal cells and the mycelium develops intercellularly. The fungus grows at 10–34° C. (opt. 29°). Manzate and dithane Z-78 both at 2 lb./100 gal. water were effective protectants. Of 8 varieties of pansy and 2 of *Viola cornuta* tested by inoculation only Cornuta Chantreyland was markedly resistant.

Angus (A.). **Note on diseases of Bracken (Pteridium aquilinum) in Scotland.**—*Trans. bot. Soc. Edinb.*, **37** (*1956–57*), 3, pp. 209–213, 1958.

In 1947–8 studies of 2 diseases of *P. aquilinum* were made at the Dept of Botany, University of Edinburgh.

'Curl tip' was observed for the most part in an outbreak at West Linton, where by summer 1947 stands which were breast-high in 1944 had been considerably thinned and reduced to 1½–2 ft., some patches being completely killed. This disease is essentially a dieback, affecting the fronds at all stages. Young ones up to 1 ft. are killed and blackened, while more mature ones are partially killed, becoming asymmetrical [cf. **8**, p. 412] and curled or arrested by the death of the apex. On the dead parts pycnidia of *Ascochyta pteridis*, *Phoma aquilina*, and *Stagonospora* sp. occurred, always together, the last being the most abundant. When young opening fronds in the greenhouse were sprayed with spore suspensions only *P. aquilina* was pathogenic: fronds of 2–3 in. were killed in 5 weeks and the fungus was re-isolated.

'*Didymella*' disease (*Didymella hyphenis*) was severe in the Port of Monteith area in 1946–7, affecting areas up to 1 acre in extent, and was also present on a few fronds collected at West Linton and Fala Moor. Fronds are attacked when more or less fully open, the commonest symptom being withering of the tip and/or one or more of the lateral pinnae, which sometimes turn brown and die back for distances up to 4 in. (resembling 'Garelochhead' symptoms [**13**, p. 815]). Perithecia were most commonly found embedded in rachis tissue. Pathogenicity tests were not carried out.

Fischer (H.). **Die Bekämpfung der Obstvirosen im holsteinischen Baumschulgebiet.** [Control of fruit viroses in the Holstein nursery region.]—*NachrBl. PflSchDienst* (*Braunschweig*), *Stuttgart*, **10**, 3, pp. 35–37, 1957.

The author describes the organization developed since 1953 by the Pflanzenschutzamt des Landes Schleswig-Holstein in a campaign to eradicate virus infection from apple, plum, peach, and cherry in the Province, particularly from the important nursery region of Pinneberg. Eradications of fruit trees during 1955–6 resulting from inspection are tabulated and the scheme for providing registered propagating material is outlined.

Current research and investigation.—*Orchard. N.Z.*, **31**, 2, p. 43, 1958.

At the Plant Diseases Division and Fruit Research Station, D.S.I.R., prior dipping in a solution of thiram (2 lb. active material/100 gal.) plus wax emulsion (1:8) reduced [unspecified] mould infection and shrivelling in passion fruit stored for 4 weeks. Zineb at the same rate was also effective against moulds but did not give quite such a good appearance to the fruit.

At Motueka, phenyl mercury chloride (ascospray) at 5 lb./100 gal. applied just before leaf fall and followed in the next season by the standard sulphur programme significantly reduced black spot [*Venturia inaequalis*: **37**, p. 7] on Delicious apples (2% infection, compared with 6·4% in controls receiving no mercury).

Posnette (A. F.) & Millikan (D. F.). **Some virus-like disorders of pome fruit trees in Missouri.**—*Plant Dis. Reptr*, **42**, 2, pp. 200–201, 1 fig., 1958.

Virus diseases newly recorded for N. America, diagnosed in Missouri on symptomatology, include apple chat fruit [**24**, p. 280], rough skin [**34**, p. 374], and rubbery wood [**30**, p. 167], and pear vein yellows and red mottle [**36**, p. 330].

Conners (I. L.). **Losses caused by Apple scab in Nova Scotia.**—*Plant Dis. Reptr*, **42**, 2, pp. 165–168, 1958.

Data covering the period 1948–55 inclusive, with details of total, processed, clean, and scabbed crop, show the loss due to *Venturia inaequalis* to have averaged $291,000/annum, and spray control cost $442,000/annum [cf. **6**, p. 734].

Kirby (A. H. M.). **Plant protective chemistry.**—*Rep. E. Malling Res. Sta., 1957*, pp. 32–34, 1958.

In further slide spore-germination tests with *Venturia inaequalis* [**37**, p. 139] with and without toxicants variation was greater between slides in the same moist chamber than within circles on the same slide; there was also variation between chambers in the same incubator.

The best materials for the control of apple powdery mildew [*Podosphaera leucotricha*: **36**, p. 596] in greenhouse tests were lime sulphur and DNOPC [dinitro-*sec*-octylphenyl crotonate]. Preliminary results indicate that the addition of some surfactants to sprays actually encourages *P. leucotricha*. Susceptibility to powdery mildew is at a maximum on the youngest leaf and protective sprays require frequent application.

In studies on the phytotoxicity of $CuSO_4$ the behaviour of detached leaves was similar to that of attached. Cu was absorbed [cf. **37**, p. 74] exponentially at first and then linearly. The time of day affected the duration of the exponential stage, which was longer in the morning.

Groves (A. B.), Wampler (E. L.), & Lyon (C. B.). **The development of an efficient schedule for the use of karathane in the control of Apple powdery mildew.**—*Plant Dis. Reptr*, **42**, 2, pp. 252–261, 1958.

The results of 3 experiments, conducted in Virginia on var. Rome and in California on vars. Rome and Jonathan by the Virginia Agricultural Experiment Station and the Rohm and Haas Co. on the control of *Podosphaera leucotricha* [**36**, p. 597] are described in detail. They indicated that karathane is best applied, starting preblossom, in small amounts at frequent intervals (not exceeding 2 weeks), 8 oz./100 gal. generally being required, though 4 oz. weekly may sometimes be sufficient on less susceptible varieties. Low dosage and avoidance of application at temps. above 90° F. reduces phytotoxic damage.

Dzagnidze (S. I.). К изучению биологии **Phomopsis mali Roberts.** [A biological study of *Phomopsis mali* Roberts.]—Сообщ. АН Груз. ССР [*Soobshch. Acad. Nauk Gruz. SSR.*], **18**, 6, pp. 727–731, 1957. [Received 1958.]

In W. and E. Georgia, USSR, apple and pear trees infected by *P. mali* were studied by the Institute for Plant Protection. It was established that the fungus is very widespread in W. Georgia on the branches of old trees and on saplings and also in fruit in storage. Pathogenicity to apple and pear samplings was established by inoculation. The most susceptible variety was Rkina; less susceptible were Antonovka, Bellefleur, Shanpanski Reinette, Lagodeisky Sinap, Nachevradsamepo, and Krimka; Kechura was moderately resistant.

McIntosh (D. L.) & Porritt (S. W.). **The effect of storing Apples in polythene box liners on the development of bull's-eye rot, caused by Neofabraea perennans.**—*Plant Dis. Reptr*, **42**, 1, pp. 97–99, 1958.

At Summerland, British Columbia, Yellow Newtown apples packed in polythene box liners developed much more infection (both natural and from inoculation) by *N. perennans* [**36**, p. 329] during cold storage than fruit in paper or stored loose. R.H. and CO_2 conc. were higher within the bags than outside. The results indicated that a much higher percentage of fruit from affected orchards is infected at harvest than was formerly realized.

Woodhead (C. E.). **Bitter pit in Apples. Horticulture Division's investigations.**—*Orchard. N.Z.*, **31**, 1, pp. 23–27, 1 fig., 1958.

Bitter pit, a serious disorder of certain apple varieties in New Zealand, in some years causes a considerable reduction of marketable yield. Gravenstein, Sturmer, and Lord Wolseley are susceptible, and Cox's Orange Pippin [**18**, p. 118] and Cleopatra highly so. The condition is rarely seen in Delicious and Dougherty. Large fruits are more susceptible than small, and the disease is more prevalent in the fruit of young trees and of mature trees carrying a light crop. It is encouraged by heavy pruning or the excessive use of fertilizers and by water shortage over a long period. Picking the fruit before it is sufficiently mature is one of the main contributory factors. Immediate storage at 32–34° F. delays onset.

Kegler (H.). **Die Ringfleckigkeit und Steinfrüchtigkeit der Birne in Mitteldeutschland.** [Ring spot and stone-fruitiness of Pear in central Germany.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **12**, 3, pp. 55–56, 2 fig., 1958.

Ring spot [? strain of pear mosaic virus] occurred in 1956 on Gellerts Butterbirne (highly susceptible), Clapp's Liebling, Bunte Juli, and Jungfernbirne in numerous orchards in Mecklenburg, Brandenburg, and Saxony [cf. **36**, p. 703; **37**, p. 290]. The virus was transmitted by chip budding from Gellerts Butterbirne to Neue Poiteau (highly susceptible), Gräfin Paris, and Clapps Liebling.

'Stone-fruitiness' [pear stony pit virus: **34**, p. 80] is reported in the vars. Gute Luise, Williams Christ, Graubirne, Boscs Flaschenbirne, and Pastorenbirne near Dresden, Magdeburg, and Berlin, and in some areas in the Harz mountains.

Borecki (Z.). **Badania nad biologią patogena Grusz, grzyba Venturia pirina Aderh. (Fusicladium pirinum Fuck.).** [Studies on the biology of the Pear pathogen, *Venturia pirina* Aderh. (*Fusicladium pirinum* Fuck.).]—*Acta agrobot.*, **6**, pp. 59–116, 2 fig., 5 graphs, 1957. [English summary (6 pp.). 45 refs.]

Investigations were made during 1952–55 at the Warsaw Central College of Agriculture and the Dept of Pomology, Skiernewice, Poland, on the development of *Venturia pirina* on the very susceptible pear vars. Sapiezanka and Grumkower Butterbirne. Mass discharge occurred when ascospores were maturing in over 50% of the perithecia (a stage which fluctuates from year to year), and when the total of av. daily temps. from Feb. 1 reached 147–155°, but spray forecasts based on this sum are unreliable, as are those based on phenological observations, and only direct examination of perithecia can give an accurate appraisal. Ascospore discharge takes place from early Apr. to early July, with a max. in May often coinciding with the flowering period, and is related more to rainfall than to air temp. Dew and rainfall up to 0·4 mm. do not cause mass discharge, but the period of rainfall is important.

The differences in the degree of infection in different years were wide. There is correlation between the disease and the amount of rainfall from mid. Apr. to mid June and between the degree of infection and the number of perithecia formed. The average number of perithecia/sq. cm. leaf varied from 41 in 1955 to 499·9 in 1952, the greatest number recorded being 1,490. The overwintering of the conidial stage in susceptible vars. is very common.

Kirby (A. H. M.) & Bennett (Margery). **Further phytotoxicity studies with phenylmercuric chloride on Conference Pear.**—*Rep. E. Malling Res. Sta., 1957*, pp. 148–151, 1 graph, 1958.

Leaf damage to young Conference pear trees was caused in 3 successive years' spraying trials with a wettable powder containing phenyl mercuric chloride applied at the normal time for control of scab [*Venturia pirina*: **33**, p. 93], namely 2 pre-blossom and 2 post-blossom treatments at 0·01, 0·005, or 0·0025% PMC. A single 0·005% spray at petal-fall caused leaf damage. Reduced fruit set and loss of crop resulted from 2 applications at 0·01% PMC applied post-blossom as well as by the full schedule. The damage was not affected by the weather either during or after spraying.

Gilmer (R. M.), Brase (K. D.), & Parker (K. G.). **Control of virus diseases of stone fruit nursery trees in New York.**—*Bull. N.Y. St. agric. Exp. Sta.* 779, 53 pp., 22 fig., 2 graphs, 1957.

The more important diseases, sour cherry yellows virus, [its suspected strain] green ring mottle [**36**, p. 332], and [peach] necrotic ring spot of cherry, and prune dwarf and [plum] line pattern viruses of plum and cherry are described, and in addition 2 other probable virus diseases. One, vein-clearing rosette of cherry, causes abnormally upright trees with rosetted terminal growth, somewhat abnormal leaves in which vein-clearing may be followed by yellowing and defoliation, reduced fruiting, and malformed fruit. The other is constriction disease of Stanley prune plum [**35**, p. 305]. Sweet cherry crinkle [cf. **36**, p. 8], crinkle leaf of prune plum [**36**, p. 769], leaf-casting mottle of prune, and warty suture of peach, which are also described, are diseases with virus-like symptoms, which are, however, probably not caused by transmissible factors.

Indexing procedures are dealt with at some length [**36**, p. 332] and there are notes on the progress of the nursery certification scheme; commercial rootstocks are the principal source of virus infection.

Kirkpatrick (J. D.), Parker (K. G.), & Fisher (E. G.). **Decline of Stanley Plum accentuated by winter injury.**—*Plant Dis. Reptr*, **42**, 1, pp. 65–70, 4 fig., 1958.

A new leaf pattern (fading of the chlorophyll, then yellow-orange to red coloration of the interveinal areas, eventually affecting the whole leaf surface) and a marked overgrowth at the bud-union are associated with decline and collapse of Stanley plum trees on Myrobalan rootstock (*Prunus cerasifera*) in New York orchards. The symptoms have not been found on trees winter injured or mechanically girdled at the soil level, 3–6 in. above the bud-union. The collapse of the trees may be explained by differential winter injury to the cambium and xylem tissues about the bud-union area. Trees with these symptoms may be subject to a factor which increases susceptibility to winter injury.

Adams (R. E.). **An apparently new virus disease of Peach.**—*Plant Dis. Reptr*, **42**, 2, pp. 203–206, 3 fig., 1958.

A new virus disease, provisionally designated embryonic abortion, found in a planting of Freeland peaches in West Virginia, is described from the Agricultural Experiment Station, Morgantown. The main symptoms are delayed appearance of leaves in spring, decline, abortion of most of the developing embryos and failure of fruits so affected to develop, and extensive gumming from the trunk, scaffold branches, and fruit. Graft transmissions to other *Prunus* spp., the symptoms on which are described, indicate that the disease is due to a complex involving necrotic ring spot [peach ring spot] virus, together with peach necrotic leaf spot and at least 1 unknown virus.

Tindale (G. B.), Jenkins (P. T.), & Peggie (I. D.). **Brown rot in canning Peaches.**—*J. Dep. Agric. Vic.*, **56**, 2, pp. 107, 109, 111, 2 fig., 1958.

Temperature studies by S. C. Chambers at the Experimental Cool Stores, Horticultural Research Station, Scoresby, showed that in culture *Sclerotinia fructicola* [**36**, p. 37] is killed by a temp. of 104° F. for 24 hr. However, when peaches were subjected to this temp., off-flavours developed and fruit injury occurred. Chambers also showed that the fungus did not grow above 94° F., but resumed growth on removal to a lower temp.

Brown rot development was extremely rapid in the range 70–90°, but above 90° it became progressively less, until at 94° it ceased. Peaches ripened at 94–95° did so with excellent development of juice, flavour, aroma, and colour, and without developing the disease. They would have to be warmed to 94–95° within about 12 hr. of arrival at the cannery and when ripened to full canning maturity should then be immediately canned. Any surplus could be kept in cool storage at 32°.

Experiments conducted to date indicate that canning peaches may be successfully ripened at 94–95° even when picked at a stage of maturity up to 7 days earlier than that now acceptable by the canneries.

Wilson (D. W.). **Stone-fruit blast experiment.**—*Orchard N.Z.*, **31**, 1, p. 32, 1958.

In an experiment laid down in 1951 by the Dept Agric., Roxburgh, to determine the effect on apricot blast (*Pseudomonas syringae*) of giving trees (Moorpark and Trevatt) one or more applications of Bordeaux mixture (10–8–100) between mid Apr. and mid. Sept. over 6 seasons it was 2 years before any differences resulting from treatment were visible. The results confirmed the general observation that Trevatt is more susceptible than Moorpark, and indicate that the treatment is partially preventive, particularly when given in late autumn and early winter, and confers a marked improvement in growth.

Streptomycin [**36**, p. 331] has proved more effective, but is very costly.

Scaramuzzi (G.). **Secondo contributo allo studio del 'mosaico' del Mandorlo in Puglia. Ulteriori ricerche sperimentali sulla malattia ed esperienze preliminari per la individuazione di 'ceppi' virosici responsabili dei suoi sintomi.** [Second contribution to the study of 'mosaic' of Almond in Apulia. Further experimental researches on the disease, and preliminary attempts to identify the virus 'strains' responsible for the symptoms.] **Terzo contributo. Indagine sulla diffusione della malattia e sulla suscettibilità delle cultivar nella zona di Cassano Murge (Bari).** [Third contribution. An investigation into the spread of the disease and the susceptibility to it of cultivars in the area of Cassano Murge (Bari).]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **14** (1–3), pp. 156–173, 5 pl. (1 col.); pp. 329–338, 1957. [English summaries.]

Continuing his investigations [cf. **36**, pp. 412, 476], the author found that the various leaf symptoms of mosaic disease of almond were due to virus infection, with one exception, which appeared to be a non-transmissible variegation. Apparently healthy trees were shown to carry latent infection. The disease was not seed-transmissible, and its spread is mainly by propagating material.

The leaf symptoms are of 4 kinds: yellow areas, veinbanding, line-pattern, and flecking, and all may be present on the same leaf. Each is associated with a different effect on the growth and yield of the diseased tree. A severe strain of the causal virus is responsible for the yellow areas, an intermediate strain for the veinbanding and line-pattern symptoms, and a mild strain for the flecking.

The second paper describes investigations in 1956 in which the percentage of trees affected in 29 varieties and the intensity of the disease on the individual trees were assessed; the results are tabulated.

Posnette (A. F.) & Cropley (R.). **A little Cherry disease in England.**—*Rep. E. Malling Res. Sta., 1957*, pp. 122–123, 1 pl., 1958.

In 1955 Waterloo and Black Elton cherry trees in an orchard in Worcestershire developed small, unpalatable fruit. Budwood from the affected trees transmitted the disorder to Lambert and Early Rivers, causing orange yellowing along the veins in the former, interveinal purpling in both, and small fruit in the latter. The disease is considered to be caused by a virus similar to little cherry in British Columbia [**36**, p. 333] and to be a potential danger to cherry production in England.

Kunze (L.). **Ein Virus der Tabak-Ringflecken-Gruppe von Süßkirsche.** [A virus of the Tobacco ring spot group in Sweet Cherry.]—*Phytopath. Z.*, **31**, 3, pp. 279–288, 4 fig., 1958. [English summary.]

At the Institut für gärtnerische Virusforschung, Berlin-Dahlem, a virus from sweet cherry [**36**, p. 599] was transmitted to tobacco by mechanical inoculation, producing symptoms in this host and other herbaceous plants indicative of the tobacco ring spot group, a finding supported by the properties *in vitro*. The virus was found regularly in trees which showed symptoms typical of the 'Pfeffinger disease' [cherry rasp leaf virus].

Scaramuzzi (G.) & Corte (A.). **La 'maculatura lineare' del Ciliegio da Fiore.** ['Line pattern' of Flowering Cherry.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **14** (1–3), pp. 351–361, 3 fig., 1957. [English summary.]

In the spring of 1956 the leaves of a flowering cherry, probably a var. of *Prunus serrulata schimidsuii*, growing at the University of Pavia, Italy, developed typical line pattern virus symptoms. Infection was first noticed about 1954. The condition was experimentally transmitted by budding and chip-budding to Shiro plum, myrobalan seedlings, Elberta peach, mazzard cherry F. 12/1 (EM clone) [cf. **36**, p. 705], and Kwanzan flowering cherry (*P. serrulata*). The resulting symptoms identified the disease with cherry banded chlorosis virus, identical with plum line pattern virus [cf. **36**, p. 196].

Cation (D.). **Two years' results of testing cyprex for control of Cherry leaf spot in Michigan.**—*Plant Dis. Reptr*, **41**, 12, pp. 1029–1031, 1957.

At Michigan State University, East Lansing, cyprex (duodecylguanadine acetate) equalled glyodin-ferbam in the control of *Coccomyces* [*Higginsia*] *hiemalis* on cherry [**36**, pp. 466, 832] in an average year and proved superior when infection was severe. The 1st spray was applied at petal fall, 2 more at 10-day intervals, and the 4th soon after harvest, ½ lb./100 gal. being adequate. Applications made within 48 hr. of an infection period failed to eradicate the fungus but provided long-range protection. Cyprex corrected injury caused by lead arsenate.

Bulit (J.) & Ridé (M.). **Observations sur le dépérissements du Cerisier en France.** [Observations on the decline diseases of Cherry in France.]—Repr. from *Bull. tech. Ing. Serv. agric.* 123, 23 pp., 1 col. pl., 22 fig., 1957. [29 refs.]

Notes, based on a questionnaire sent out to growers and on personal observations, are presented on a number of forms of cherry decline due to parasites and to non-parasitic causes [**33**, p. 137; **34**, p. 793; **35**, p. 305]. *Pseudomonas mors-prunorum* is a major cause of decline [**37**, p. 94].

Kulikov (V. A.). Американская мучнистая роса Крыжовника и борьба с ней. [American Gooseberry mildew and its control.]—С.-Х. Поволожья [*S.-Kh. Povolozh'ya*], *1957*, 5, pp. 56–57, 1957. [Abs. from *Referat Zh. Biol. 1958*, 2, pp. 196–197, 1958.]

American gooseberry mildew [*Sphaerotheca mors-uvae*: **35**, p. 864] in the U.S.S.R.

was checked by spraying gooseberry bushes immediately after flowering with water at 80° C.

CADMAN (C. H.) & FISKEN (A. G.). **Susceptibility of Raspberry varieties to infection by aphid-borne viruses.**—*J. hort. Sci.*, **33**, 1, pp. 13–20, 1958.

Observations at the Scottish Horticultural Research Institute, Mylnefield, Invergowrie, showed considerable differences in the susceptibility of raspberry vars. to the raspberry leaf spot and veinbanding viruses transmitted by *Amphorophora rubi* [cf. **37**, p. 200]. Lloyd George, Malling Exploit, and Malling Promise proved the most susceptible to leaf spot virus, and Malling Landmark and Norfolk Giant the most resistant, percentages of infection in trials in 1954 and 1955 being 64 and 90, 62 and 87, 41 and 72, 2 and 22, and 0 and 0, respectively. On the other hand, Malling Promise, Malling Exploit, and Norfolk Giant were resistant to veinbanding virus, whereas Lloyd George and Malling Jewel proved susceptible, the number of plants infected (out of 20 of each variety) during 1953 and 1955 being 1 and 0, 0 and 5, 3 and 3, 11 and 12, and 11 and 13, respectively. On Lloyd George systox sprays (0·1% active ingredient at 250–300 gal./acre) in late June and again at the end of July or early Aug. proved more effective than D.D.T. or parathion in reducing aphid populations, a single spray kept this below $\frac{1}{20}$ of the untreated.

CADMAN (C. H.). **Uprawa Malin i Truskawek w świetle badań nad chorobami wirusowymi.** [Some applications of virus research to Raspberry and Strawberry breeding.]—Pracé Inst. Sadow. Skierniewicach (*Exp. Works Inst. Pomol. Skierniewice*), **2**, pp. 41–51, 1957. [Russian and English summaries.]

This is a review of recent work in Great Britain on raspberry and strawberry viruses and the production of virus-free stocks.

MARSHALL (G. E.). **Strawberry virus and insect vectors.**—*Proc. Ind. Acad. Sci.*, **66** (*1956*), p. 103, 1957.

The effectiveness of the various measures proposed from time to time in different parts of the United States to prevent the spread of virus diseases of strawberries [**37**, pp. 97, 173] may be questioned, inasmuch as the aphid vectors (*Capitophorus*) are present on the plants from early spring until late autumn.

A comparison at Purdue University Agric. Exp. Sta. in 1955 of the number of new plants per mother plant produced by 4 varieties showed an average increase of 2 for the virus-free stock. The average numbers of new plants from virus-free and common stock, respectively, were: Aroma, 7·51 and 5·67; Dunlap, 10·22 and 7·88; Premier, 7·62 and 7·32; and Robinson, 8·92 and 5·55.

JORGENSEN (P. S.). **Strawberry virus transmission by insert graft.**—*Plant Dis. Reptr*, **41**, 12, pp. 1009–1010, 2 fig., 1957.

At the Strawberry Institute, Morgan Hill, California, strawberry viruses were readily transmitted by a simplified graft method [cf. **36**, p. 255]. Small, boatshaped pieces of tissue from a petiole of the plant to be indexed are inserted in slits in the petioles of the indicator (alpine *Fragaria vesca*) and the graft is covered with cellophane tape.

CROPLEY (R.). **Erratic transmission of Strawberry viruses by grafting excised leaves.**—*Rep. E. Malling Res. Sta., 1957*, pp. 124–125, 1958.

Strawberry viruses in commercial varieties were not satisfactorily transmitted to *Fragaria vesca* by a leaf grafting technique [**36**, p. 255; **37**, p. 97], possibly because of the age of the petioles of the indicator plants or because the scion leaflets did not contain virus.

MAASSEN (H.). **Acyrthosiphon pelargonii ssp. rogersii Theob. als Vektor von Erdbeer-viren in Mitteldeutschland.** [*Acyrthosiphon pelargonii* ssp. *rogersii* (Theob.) as a vector of Strawberry viruses in central Germany.]—*NachrBl. dtsch. PflSchDienst, Berl*, N.F. **12**, 2, pp. 39–40, 1 fig., 1958.

A. p. ssp. *rogersii*, sometimes numerous on strawberries in central Germany, was demonstrated to be a vector of an as yet unidentified virus causing chlorosis in the var. Sachsen in the summer months. First symptoms, consisting of crinkling and upward rolling of the edges in the youngest leaves, appeared on *Fragaria vesca* after 16 days; the subsequent leaves exhibited, in addition to mild crinkle and deformation, a clearly defined chlorosis which was more marked at the margins, while the petioles were shortened and the blades somewhat reduced and uneven in size.

MCKEEN (W. E.). **Red stele root disease of the Loganberry and Strawberry caused by Phytophthora fragariae.**—*Phytopathology*, **48**, 3, pp. 129–132, 7 fig., 1 graph, 1958.

Most of this information on the disease in Canada has been noticed [**36**, p. 334]. The fungus was shown to be pathogenic to loganberry, Cascade berries, and *Fragaria vesca*.

MCLEAN (D. M.). **Sclerotinia on Strawberry fruit in Northwest Washington.**—*Plant Dis. Reptr*, **41**, 12, p. 1057, 1 fig., 1957.

S. sclerotiorum was found forming mycelium and sclerotia over the surface of ripening strawberry fruits in experiment station plots at Mount Vernon in 1957. This is the first record of the fungus on strawberry in Washington.

BRUN (J.). **Étude sur l'action des fongicides huileux dans la lutte contre la cercosporiose. Note préliminaire.** [Study on the action of oil fungicides in the control of cercosporiosis. Preliminary note.]—*Fruits d'outre mer*, **13**, 1, pp. 3–14, 5 fig., 19 graphs, 1958.

In further studies of low-volume spraying of banana plantations [cf. **37**, p. 447] the effect of oil sprays plus a fungicide (copper oxychloride) was investigated in a series of tests at the different stages of development of infection by *Cercospora musae* [*Mycosphaerella musicola*: **36**, p. 40 and see below]. These were defined as follows: I, a very small light green dot or dash, max. length 1 mm.; II, extended to several mm.; III, an elongated, rusty brown spot with ill defined outline; IV, a fully grown spot, with a dark brown centre, often surrounded by a yellow halo, and with sporulating conidiophores; V, the final stage, a grey, dried up centre, usually ringed in black, persisting when the leaf has dried out. Stage IV, under favourable conditions, is when sporulation is most abundant; the parasite is most sensitive to treatment then and during germination, when the mycelium is superficial and the streaks develop.

Experimental results, which are tabulated, demonstrated that the difference between oil alone and oil+Cu is very small. At sporulation the mixture is superior, but for preventing germination and formation of incipient streaks either is equally effective. When treatment is applied correctly and the leaf is completely covered, a developing attack can be effectively arrested by a single application. Failure to obtain control results from faulty practice. Young leaves were not scorched when a mixture at 6 l./ha. was applied to the lower surface; it arrested serious attacks in full development.

GUYOT (H.) & CUILLÉ (J.). **Essai de prévision des attaques de Cercospora en Guadeloupe.** [Attempts at forecasting attacks of *Cercospora* in Guadeloupe.]—*Fruits d'outre mer*, **13**, 3, pp. 85–94, 1 fig., 7 graphs, 1958.

Details are presented of the results of 2 yrs.' laboratory studies and field observa-

tions on 200 banana plantations with records and data analyses of dew formation, R.H., rainfall, and temperature, as these relate to attack by *C. musae* [*Mycosphaerella musicola*: cf. **35**, p. 620], also mycelial growth rates in the banana leaf, which are regarded as the critical factor and are assessed by the series of leaf symptoms marking the progressive stages of the disease [see above]. The aim is to forecast attacks and thereby reduce the number of low-volume mineral oil sprays. It was found, however, that conditions are so varied that a separate series of observations would be required on each plantation each season.

Bouriquet (G.) & Bataille (J.). **Deux champignons parasites du bananier à Madagascar : Cercospora musae et Alternaria musae nov. sp.** [Two parasitic fungi on Banana in Madagascar: *Cercospora musae* and *Alternaria musae* nov. sp.]—*Fruits d'outre mer*, **13**, 2, pp. 47–52, 7 fig., 1958.

This is the 1st report of *Mycosphaerella musicola* (conidial state only) in Madagascar [map 7], which is described. It does not appear to be sufficiently severe to warrant control. On the affected tissues was a dematiaceous fungus, forming a slight dark felting, with conidia 50·8 (12·8–77·9) × 14·2 (8·2–20·5) μ; on potato dextrose agar they were 25 (20·5–32·8) × 12 (8·2–14·4) μ. A new species is proposed, *A. musae* Bouriquet & Bataille.

Two other fungi from dead parts of banana leaves, namely *Glomerella* sp. and *Leptosphaeria* sp., are described and figured, but not named.

Rangaswami (G.) & Damodaran (K. A. P. S.). **In vitro action of mycostatin on fungi pathogenic to Banana.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 126–129, 1958.

In studies at the Mycology and Plant Pathology Section, Agricultural Research Institute, Coimbatore, mycostatin [**36**, p. 544] was active *in vitro* against 3 fungi pathogenic to banana. The inhibitory concentrations for the agar-streak dilution assay were: *Helminthosporium torulosum* 2·5, *Gloeosporium musarum* 2·5, and *Fusarium oxysporum* [f.] *cubense* 10 μg./ml., the corresponding figures for the spore germination assay being 10, 12·5, and 25, and for the culture disk assay 10, 50, and 1,000.

Sequeira (L.). **Bacterial wilt of Bananas : dissemination of the pathogen and control of the disease.**—*Phytopathology*, **48**, 2, pp. 64–69, 1 fig., 1 graph, 1958. [24 refs.]

At the Coto Station of the United Fruit Co., Golfito, Costa Rica, *Pseudomonas solanacearum* [cf. **32**, p. 671] was readily transmitted by pruning knives (but not if these were disinfected in 5% phenol), and also by infested soil coming in contact with wound surfaces. Soil treatment with a number of chemicals proved ineffective, but disking the soil 5 times during the dry season, followed by 9 months fallow, was very successful in reclaiming infested areas, as the organism is highly susceptible to desiccation. None of the wild or cultivated plants inoculated with the banana strain of the bacterium was found to be susceptible.

Bingham (F. T.), Zentmyer (G. A.), & Martin (J. P.). **Host nutrition in relation to Phytophthora root rot of Avocado seedlings.**—*Phytopathology*, **48**, 3, pp. 144–148, 1958. [24 refs.]

In culture solution studies at Riverside, California, avocado pear seedlings (var. Mexicola) [**37**, p. 175] were inoculated with *P. cinnamomi* by suspending infected sterilized lucerne stems in the solution. Lesions appeared on the roots in 4–5 days. In pot experiments the soil was infested with wheat-oats inoculum, symptoms appearing within 4–5 weeks. High N and K in the culture solutions somewhat retarded the disease, possibly because of high general salt conc. rather than a

specific increase of the 2 elements, though their diminution did not increase it; P was without effect. As the fungus was able to tolerate a wide range of soil salts, control of the disease by altering the salt content appears impracticable.

In view of these results the partial benefit noted from the use of lucerne meal as a soil amendment is probably referable to an induced change in the soil microflora rather than in host nutrition.

Bertini (S.). **Un seccume fogliare dell' Olivo prodotto da Sphaeropsis oleae (D. C.) n.comb. (= Macrophoma oleae (D.C.) Berl. et Vogl.).** [A leaf wilt of Olive produced by *Sphaeropsis oleae* (DC) n.comb. (= *Macrophoma oleae* (DC) Berl. & Vogl.).]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **14** (1–3), pp. 313–325, 1 pl., 2 fig., 4 graphs, 1957. [English summary.]

In April 1957 the author received from the Province of Lucca, Italy, olive leaves bearing large dried-up areas, usually near the apex, caused by *M. oleae* [**24**, p. 24]. In culture the pycnidiospores became dark and the wall thickened; the pyriform or globose pycnidia were 200–300 μ diam., and the hyaline, elongated, cylindraceous spores measured 15·6–18·5 $\times$ 3·9–5 μ, according to the substrate. In view of its characters, the fungus is renamed *S. oleae* (DC) n.comb., a revised diagnosis being given.

Lebeau (J. B.) & Logsdon (C. E.). **Snow mould of forage crops in Alaska and Yukon.**—*Phytopathology*, **48**, 3, pp. 148–150, 4 fig., 1958.

A more detailed account of a study already noticed [**37**, p. 363]. *Typhula idahoensis* is also noted as a pathogen on *Poa pratensis* in Yukon, but was not found in the far north. *Sclerotinia borealis* caused severe damage to rye, as well as to grasses, in Alaska. Of the forage crops observed, *Medicago falcata* proved the most resistant to winter conditions in both areas.

Sprague (R.). **Some leafspot fungi on western Gramineae. XI.**—*Mycologia*, **49** (*1957*), 6, pp. 837–853, 2 fig., 1958.

This contribution [**36**, p. 323] gives descriptions of new or noteworthy fungi collected chiefly in Montana, Wyoming, and Idaho. They include *Selenophoma donacis* on *Poa palustris*, *Agropyron repens*, *A. cristatum*, *A desertorum*, and *Elymus macounii* (the last-named infected also by *Ustilago bullata*), and *Gloeosporium meinersii* and *Heterosporium phlei* on *Phleum pratense*.

Wells (H. D.), Robinson (B. P.), & Latham (J. M.). **Diseases of southern turf grass and their control.**—*U.S. Golf Ass. J.*, **9**, 7, pp. 25–30, 1957. [Abs. in *Herb. Abstr.*, **27**, 3, p. 205, 1957.]

At the University of Georgia Coastal Plain Experimental Station, Tifton, control of cottony blight (*Pythium aphanidermatum*) [**31**, p. 330] was given by captan 50-W+actidione (1 lb.+1·2 g./1,000 sq. ft.), applied at sowing and at half these rates subsequently.

Control of dollar spot disease (Sclerotinia homoeocarpa) by cadmium chloride/urea fungicide.—*Sports Turf Bull.* 41, p. 7, 1958.

Seven monthly applications of cadmium chloride/urea (2 pints/32 gals. water/1,600 sq. yd.) to the bowling green of the Briton Ferry Steel Co., Ltd., Glamorgan, in which every summer the fescue [*Festuca* sp.] had become progressively more weakened by attacks of dollar spot (*S. homoeocarpa*) [**36**, pp. 565, 701] left the turf (examined in Nov. 1957) entirely free from any visible signs of infection and in excellent condition. The same fungicide also gave effective control on bowling greens in 3 localities in Lancashire and on other greens elsewhere, but where too few applications were made the disease appeared again during the season. A heavy attack may require 4 pints/1,600 sq. yd.

Braverman (S. W.). **Leaf streak of Orchard grass, Timothy, and Tall Oatgrass incited by Scolecotrichum graminis.**—*Phytopathology*, **48**, 3, pp. 141–143, 1 graph, 1958.

The life history, morphology, and cultural characters are described from the U.S. Regional Pasture Research Laboratory, University Park, Pennsylvania. *S. graminis* has been reported as the cause of leaf infection of 150 grasses [**34**, p. 459; **35**, p. 612] in the U.S.A., S. America, and Europe. Brown elongated streaks with tufts of conidiophores develop in the necrotic tissue, in which the fungus overwinters, and subepidermal stromata are also formed. The opt. temp. for growth and conidial germination of isolates from *Dactylis glomerata*, *Phleum pratense*, and *Arrhenatherum elatius* was near 25° C. There were some cultural differences between the isolates, and those from *D. glomerata* would not attack *P. pratense*, though one from the latter caused mild infection of *D. glomerata*.

Leach (C. M.) & Pierpoint (Merle). **Rhizoctonia solani may be transmitted with seed of Agrostis tenuis.**—*Plant Dis. Reptr*, **42**, 2, p. 240, 1958.

At Oregon Agricultural Experiment Station, Corvallis, *R.* [*Corticium*] *solani* was found for the first time to be transmitted by seed of *Agrostis tenuis*. The amount of such infection was, however, negligible in Oregon-grown seed.

Gottlieb (D.), Volovsky De Hernandez (Dora), & Rogers (M.). **The resistance of various grasses to Ophiobolus graminis.**—*Plant Dis. Reptr*, **42**, 1, pp. 26–29, 1958.

In greenhouse experiments at the Departmento de Producción Agraria, Santiago, Chile, *Agropyron* and *Bromus* spp. grown in pots of inoculated soil were very susceptible to *O. graminis* [cf. **31**, p. 548; **37**, p. 276], whereas *Agrostis*, *Arrhenatherum*, and *Oryzopsis* were the most resistant. *Festuca rubra* and *Alopecurus pratensis* should not be grown in infested areas. Among the important resistant grasses are *Dactylis glomerata*, *Phalaris arundinacea*, *Festuca* K31, and sorghum.

Govinda Rao (P.), & Koteswara Rao (D.). **A new record of Piricularia from India.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 107–109, 1 fig., 1958.

P. oryzae f. *brachiariae* f. nov., found at the Agricultural College Farm, Bapatla, on *Brachiaria mutica* [**34**, p. 667], an excellent fodder grass, native to America and West Africa but now commonly grown in South India, was readily pathogenic only to its own host, forming typical lesions. It resembles *P. oryzae* in its general morphology and foliar symptoms.

Wells (H. D.), Burton (G. W.), & Jackson (J. E.). **Burning of dormant Dallisgrass shows promise of controlling ergot caused by Claviceps paspali Stev. & Hall.**—*Plant Dis. Reptr*, **42**, 1, pp. 30–31, 1 fig., 1958.

Observations at the Experiment Station, Tifton, Georgia, in 1954–56 suggested that burning of dormant *Paspalum dilatatum* is effective in inactivating sclerotia of *C. paspali* [**36**, p. 766] and producing an early seed crop.

Matsulevich (B. P.). Вивчання деяких властивостей мозаїк Конюшини. [Studies on some characteristics of Clover mosaic.]—*J. Microbiol., Kiev*, **18**, 4, pp. 3–10, 5 fig., 1956. [Russian summary. Abs. from *Referat. Zh. Biol., 1958*, 4, pp. 47–48, 1958.]

A detailed study in several districts of the Ukraine, U.S.S.R., on red clover mosaic [**36**, p. 651], which is very widespread in the region, showed that it is caused by a complex of 2 viruses, pea mosaic and pea wilt, which are inactivated at 70° C. Recommendations are given for its control.

Shumĭlenko (E. P.). Микофлора семян Клевера в Свердловской области. [Fungal flora of Clover seeds in the Sverdlovsk region.]—*Trud. Inst. Biol. Acad. Nauk U.S.S.R.*, fil. Ural, Ser. 5, 2, pp. 3–13, 4 fig., 1954. [Received May 1958.]

Studies in the Sverdlovsk and Molotovsk districts in the Urals showed that *Alternaria tenuis* [**37**, p. 176] and *Fusarium avenaceum* [**36**, p. 766] are the main fungi attacking the clover crop, and are both transmitted by seed. Treating seed with B and Mn and a slime suspension from the Mn mines increased germination and accelerated growth. Granosan (2 g./kg. seed at conditioned humidity) checked the diseases to a certain extent.

Drake (C. R.). **Diseases of Birdsfoot Trefoil in six Southeastern States in 1956 and 1957.**—*Plant Dis. Reptr*, **42**, 1, pp. 145–146, 1958.

Surveys in Virginia, W. Virginia, Kentucky, Tennessee, N. Carolina, and Maryland for diseases of birdsfoot trefoil (*Lotus corniculatus*), which limit the productive life of stands to only 2–3 yr., showed that most of the foliage blight caused by *Rhizoctonia* [*Corticium*] *solani* developed during warm, rainy weather as the plants approached maturity. Root rots (*Fusarium* spp., *Verticillium* spp., and *Macrophomina phaseoli*) occurred mainly in spaced-plant nurseries. *Stemphylium loti* [**36**, p. 593] was most damaging in the spring and autumn.

Weltzien (H. C.). **Untersuchungen über den Besatz von Luzernesamen mit Pilzen und deren Ausschaltung durch Beizung.** [Studies on the fungal infection of Lucerne seed and its eradication by treatment.]—*Z. PflKrankh.*, **64**, 12, pp. 705–718, 1 fig., 1957. [English summary.]

When sown on bran agar at the Institut für Pflanzenschutz der Landwirtschaftlichen Hochschule, Stuttgart-Hohenheim, nearly all untreated lucerne seed developed bacterial colonies and 28% fungal growth; only 25% germinated. An $HgCl_2$ dip at 0·1% for 5 min. inhibited all fungal and almost all bacterial growth.

When 15 lucerne seed samples (200 each) were sown on moist filter paper the level of fungal infection ranged from 2 to 22%. There were 245 seeds with fungal growth and 75·5% produced spores. *Phoma herbarum* var. *medicaginis* [**36**, p. 531] was the most common of these (27·8%), followed by *Penicillium* sp. (27·4%); other contaminants were *Alternaria tenuis* (7·3), *Stemphylium consortiale* [cf. **24**, p. 42] and/or *Pleospora herbarum* [cf. **33**, p. 357] (7·3), *Aspergillus* sp. (2·9), *Colletotrichum* sp. (2), and *Fusarium* sp. (0·8).

Germination performance was then studied in relation to these fungi. The potential parasites *A. tenuis*, *P. herbarum*, *Phoma h.* var. *medicaginis*, *C.* sp., and *F.* sp. were markedly more frequent on seed which rotted or germinated poorly, suggesting a causative role. *Penicillium* sp. and *Aspergillus* sp. were by contrast more numerous on seed which germinated well. In pathogenicity tests seed was sown on filter paper and sprayed with spore suspensions. Two of 4 strains of *F.* sp. and all 3 of *Phoma h.* var. *medicaginis* were strongly pathogenic; 2 of 4 *Pleospora herbarum* and the single *C.* strain were mildly so. *Alternaria tenuis* and *S. consortiale* were non-parasitic. The results of parallel tests with autoclaved soil were essentially similar.

Seed treatment with ceresan dry and cerenox-special dry considerably reduced or eliminated contamination with actinomycetes and all but *Phoma* and *S.*, which persisted at an appreciable level.

It is concluded that *Phoma h.* var. *medicaginis* is an important contaminant of lucerne seed; *S. sarciniforme* [**25**, p. 455; cf. **36**, p. 593] was not encountered. The nature of fungal contamination did not vary according to the locality of origin of the samples.

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